

THE NEW OXFORD GEOGRAPHIES

II

**THE SOUTHERN
CONTINENTS**

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WILLIAM PER H. STEMBRIDGE

OXFORD UNIVERSITY PRESS

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THE NEW OXFORD GEOGRAPHIES

By JASPER H. STEMBRIDGE

BOOK II THE SOUTHERN CONTINENTS



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PREFACE

IN writing the *New Oxford Geographies* I have laid emphasis on the human side of Geography, and, in the words of the Spens Report, I have tried to give 'a conception of the world and its diverse environments and peoples, which should enable boys and girls to see social and political problems in a truer perspective, and give them sympathetic understanding of other peoples'.

When I was requested by a number of teachers to undertake this series I asked them to co-operate with me in its planning and preparation. I owe more than I can say to their valuable suggestions and constructive criticisms. Particularly is this the case as regards the general scheme, which aims at providing a *graded* course for pupils in Secondary Schools who are working for the School Certificate and similar examinations. I have dealt with basic geographical principles as they have arisen in connexion with the various regions.

A study of the Geography syllabuses of some hundred and fifty schools showed that while almost all of them were based on the principles laid down in the Spens Report, there was a considerable divergence in detail. That, I think, was all to the good, but it does not lighten the work of an author, and to suit the curricula of different schools there are alternative arrangements of the continents.

Throughout the series I have tried to avoid over-generalization. I have used as often as possible concrete and detailed descriptions of places and scenes to exemplify and illustrate the way in which Man's life is conditioned by his environment, and how his activities are influenced by the seasonal rhythm.

In all the books maps and photographs are closely linked with the text. The maps are simple. They are designed to bring out salient facts and are intended to supplement, but not to replace, the maps in a good atlas. Each photograph has been selected for its geographical interest, and both in the underlines and in the text attention is drawn to the important features.

The exercises are intended to encourage the pupils to master the text, and also to make intelligent use of the maps and photographs, and of the indexes.

I may be excused for inviting special attention to the Index. Every student knows the value of an index as giving in detail the contents of the book, as making reference easy, and as bringing together the several places in which the same or cognate matters are discussed. Every progressive teacher knows the usefulness of an index in training pupils in the practice of finding out things for themselves. It is my earnest hope that the Index to each book will be found satisfactory to both teacher and pupil.

I should like to express my thanks for reading the proofs and for their criticisms to Mr. G. H. Ely, Mr. J. Myers; to my former colleague on the Board of Education Geography Panel, Mr. J. W. Page; and to Mr. A. L. P. Norrington of the Oxford University Press.

J. H. S.

OXFORD

August 1941

NOTE

In this series Book II deals with the Southern Continents—South America, Africa, and Australia, in that order; Book III with North America and Asia. The matter contained in these two books is also obtainable in a different arrangement. Section 2 contains South America and North America, Section 3 Africa, Australia, and Asia. As this is a graded course South America is naturally treated on simpler lines than North America. Therefore, in the alternative arrangement, South America precedes North America, and, similarly, Africa and Australia precede Asia.

Each of the Continents is also obtainable separately.

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FIG. 1. Columbus's ship.

SOUTH AMERICA

CHAPTER I

THE OPENING UP OF SOUTH AMERICA

The Age of Discovery

FOR America the Age of Discovery may be said to have dawned on October 12th, 1492, when Columbus's little ships, after weeks of buffeting by the Atlantic waves, reached what is now Watling Island, in the West Indies. Though at least five hundred years previously adventurous Vikings from Scandinavia had visited the north of North America, yet the existence of the southern portion of the great continent was quite unsuspected by Europeans until the voyage of the famous Genoese seaman. Columbus's enterprise sprang from his belief that the earth was a globe. The land route to India was well known; gold, precious stones, and spices found their way from that country to European markets; if the earth were a true globe, so Columbus argued, India might be reached by sailing westward across the Atlantic, and the overland journey with its

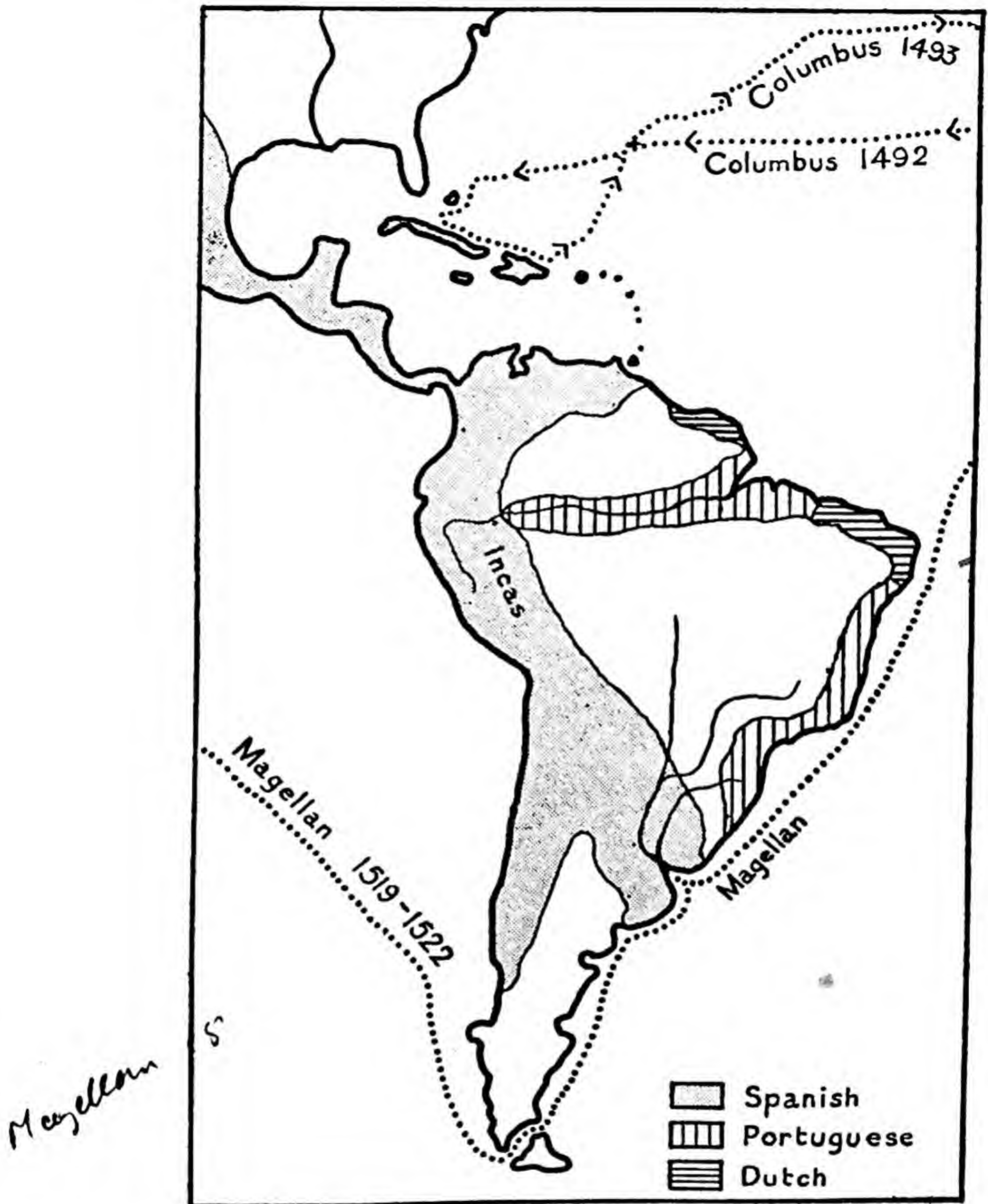


FIG. 2. The voyages of Columbus and Magellan.

many perils avoided. When he landed on Watling Island he believed he had reached India, and for this reason called the native inhabitants 'Indians', a name by which they are known to this day.

Subsequently Columbus made three other voyages to South America, during which he discovered Trinidad and Cuba, but he does not appear to have visited the mainland of the continent. In 1500 the Portuguese admiral *Pedro Cabral*, while attempting to sail round the south of Africa, was carried before the South-East Trades to Brazil. To prevent disputes between the Spaniards and the Portuguese, the Pope fixed a line that gave Portugal the eastern portion of Brazil and assigned the rest of South America to Spain.

Stirred by the discoveries of Columbus and Cabral, *Amerigo Vespucci*, an Italian seaman assisted by the King of Portugal, explored the coasts of Brazil and gave his name to America. Later, *Ferdinand Magellan*, a Portuguese sailor in the service of Spain, made his wonderful voyage round the south of South America. Battling against the Brave West Winds, he sailed through the strait (1520) that now bears his name and entered a great ocean which, owing to its comparative peace compared with the stormy waters of the South Atlantic, he named the Pacific. Magellan was killed in the Philippines, but one of his vessels succeeded in returning home by way of the Indian Ocean, its crew making the first voyage round the world.

From the work of these and other explorers it became clear that America was an immense continent, stretching almost from Pole to Pole, with climates ranging from bitter cold to great heat; teeming with plants and animals unknown in Europe, and inhabited by peoples whom the white discoverers called Indians.

Across the Isthmus of Panama

After the voyages of Columbus, successive bands of Spaniards ventured across the Atlantic to America. Sailing

before the North-East Trades they were carried towards the Caribbean Sea, but on their homeward voyages they set their courses farther north so as to take advantage of the westerly winds blowing towards Europe. As they failed to find gold, silver, and precious stones in the West Indies, they turned their attention to Mexico and Central America where their quest was rewarded. In 1515 some adventurers made their way over the mountains of the isthmus of Panama and reached the ocean where their leader *Balbao*, overcome by emotion, plunged into the water and claimed possession of the sea for Spain.

Among his followers was one *Pizarro*, a man of lowly birth but one of the greatest and most ruthless soldiers of his time. Urged by ambition, the desire for gold, and the wish to convert the Indians, Pizarro determined to explore the unknown lands of South America flanking the seaboard of the newly discovered ocean. But it was not until November 14th, 1529, that he set sail from Panama in a small boat and journeyed along the densely forested and mountainous west coast. After several unsuccessful attempts he reached the Gulf of Guayaquil south of which the coast, though arid, was more accessible than farther north. In 1531, with only 177 white followers comprising 110 men on foot and 67 horsemen, he landed on the seaboard of Peru and made his way inland into the heart of the Inca Empire, rich in untold gold.

The Incas and Their Spanish Conquerors

Fortune favoured Pizarro. He owed much to the treachery of some of the Emperor's subjects. Within two years, incredible as it may seem, he and his little band of blood-thirsty adventurers succeeded in conquering the immense Inca Empire, which included the Andean states now forming Ecuador, Peru, and Bolivia, together with most of Chile and Argentina.

In contrast to the primitive tribes inhabiting the hot wet

forests of the Amazon lowlands the Incas were highly civilized. On their lofty plateaux they built fortresses, palaces, and temples of huge blocks of stone. Their capital, Cuzco, was linked with all parts of their country by paved roads, which were carried across deep precipitous valleys by suspension bridges. The hill-sides, cut into terraces and irrigated by water brought through pipes and aqueducts from snow-clad ranges, were planted with maize and potatoes, crops indigenous (native) to America. Flocks of llamas and alpacas grazed on the hill-sides. The llamas, which were used as pack though not as draught animals, provided meat and milk, and yielded silky wool.

In the Inca Empire poverty was unknown. Life in Cuzco was an ever-entertaining spectacle. Here lived the Inca himself who claimed descent from the Sun. Along narrow streets, bordered by stone houses and small vault-like shops, princes and priests, peasants and soldiers, ladies in litters borne by dusky bearers, and laden llamas with their drivers trotting behind, passed to and fro. Women spun and wove wool; potters fashioned vessels of graceful form; the workshops of artificers in gold, silver, and copper resounded with the blows of hammers, and smiths forged weapons of bronze, an alloy of tin and copper, metals still mined in the Andes.

But the glory of Cuzco departed, for it was destroyed when the Inca Empire fell before the fierce onslaughts of the Spaniards. Yet though the loss of life was terrific and the flower of the Inca race was butchered, the people were not wholly exterminated, and their descendants now comprise the majority of the inhabitants of the Peruvian and Bolivian plateaux.

Having reduced to slavery those Indians who survived, Pizarro established the viceroyalty of Peru which included Ecuador, Bolivia, northern Chile, and the Argentine. In a valley close to the west coast, more easily reached from the sea than Cuzco, he founded the new and splendid capital of Lima.

Chile was conquered by other Spaniards, led by *Pedro de Valdivia*, who adopted the cruel methods of Pizarro. In 1541 Valdivia built Santiago; he laid the foundations of Valparaiso, La Serena, and other towns, including that named after him.

Orellana, another of Pizarro's officers, crossed the Andes and descending one of the tributaries of the Amazon sailed down the main stream. After a voyage of peril and hardship he and his men reached the mouth of the river, whence they made their way to Trinidad before returning to Spain.

Other Spaniards, approaching South America from the Atlantic, settled round the Plate estuary and explored the grass-covered pampas of the Argentine. The colonists found no horses, cattle, or sheep, no cereals except maize, and no fruit trees. All these things they introduced from Europe. So great was the terror inspired in the minds of the natives by the mounted Spaniards that the latter found victory easy, for the people believed man and horse to be one tremendous, two-headed monster!

The Portuguese in Brazil

Meanwhile the Portuguese were colonizing Brazil. But unlike the Spanish *conquistadores* of the West, they discovered no rich and populous cities or hoards of gold. They founded towns, like Bahia and Pernambuco, along the coast, but though they sent expeditions into the forested interior their settlements were mainly confined to the seaboard. The colonists turned their attention to agriculture, growing indigenous crops, such as sugar-cane and cacao, both of which were greatly prized.

The Peoples of South America

Unlike the British, French, and Dutch who settled in North America, the Spanish and Portuguese did not bring their womenfolk with them but married Indians. Thus there grew up a people of mixed Indian and Spanish or (in

CHAPTER II

SOUTH AMERICA: PHYSICAL FEATURES,
CLIMATE, AND VEGETATION**Barriers to Communication**

THE tapering continent of South America has an area of about seven million square miles. It is somewhat smaller than its sister continent of North America. Comparing it with the other Southern Continents we find that South America is about two-thirds the size of Africa, but more than twice the size of Australia. All of the Southern Continents are compact, but in South America the great estuaries of the Orinoco, the Amazon, and the Plate open to the Atlantic Ocean. The Pacific seaboard is less fortunate. Only in the south is the coast indented, and here the winding fiords merely lead to a rugged and sparsely peopled interior.

The map (Fig. 3) shows that South America may be divided into three main physical divisions:

- (1) the Andes,
- (2) the Eastern Highlands, and
- (3) the Central Lowlands.

On the west the unbroken ranges of the mighty Andes, which rise steeply from the Pacific seaboard, shut out oceanic influences, and form a formidable barrier between the Pacific coast-lands and the remainder of the continent. In the east the Guiana and Brazilian Highlands partly separate the lowlands of the Orinoco, the Amazon, and the Plate. The divide between the Amazon plains and those of the Plate to the south and the Orinoco to the north is of little elevation. But the luxuriant forests of the Amazon are almost as great a barrier to communication between north and south as the lofty Andes are between west and east.

The Andes

The Andes, the longest continuous mountain range in the world, extend for 4,500 miles from the isthmus of Panama to the Strait of Magellan. They are broadest in the centre, where they are from 400 to 500 miles wide. The average height of the cordilleras is 13,000 feet, but many snow-clad summits rise to over 20,000 feet. The name *cordillera* is a Spanish word meaning a *rope* or *chain*, and it was the Spaniards who applied this name to the Andes. The Andes form roughly parallel chains (Fig. 4). From the Caribbean Sea four ranges run southwards towards the Equator where they meet in a great mountain knot. Between these chains lie valleys and intermont plateaux, such as the Plateau of Ecuador. South of the Gulf of Guayaquil the chains enclose the Peruvian Plateau, while farther south an eastern and a western chain shut in the Plateau of Bolivia. In Central Chile the lofty main chain and lower coastal ranges enclose the long nar-

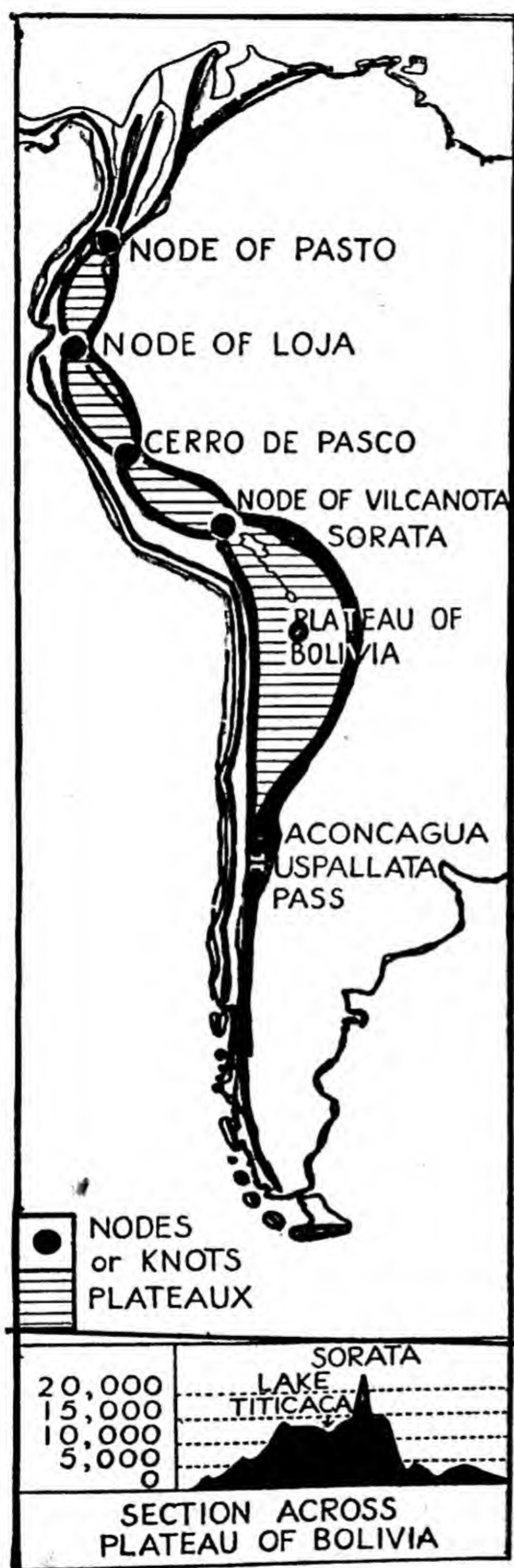


FIG. 4. Diagram of the Andes.

row Vale of Chile. The main chain culminates in the extinct volcano of Aconcagua, 22,800 feet, the highest peak in South America. To the south-west of this peak lies the Uspallata Pass, 12,800 feet, one of the few passes over the Andes, which forms a route between Chile and the Argentine. In Southern Chile the coast has sunk and the sea penetrates far into steep-sided fiords. The coast range is partly submerged, but its higher peaks form a festoon of precipitous islands, while the main chain of the Andes rises steeply from the Pacific.

Fold-Mountains, Volcanoes, and Earthquakes

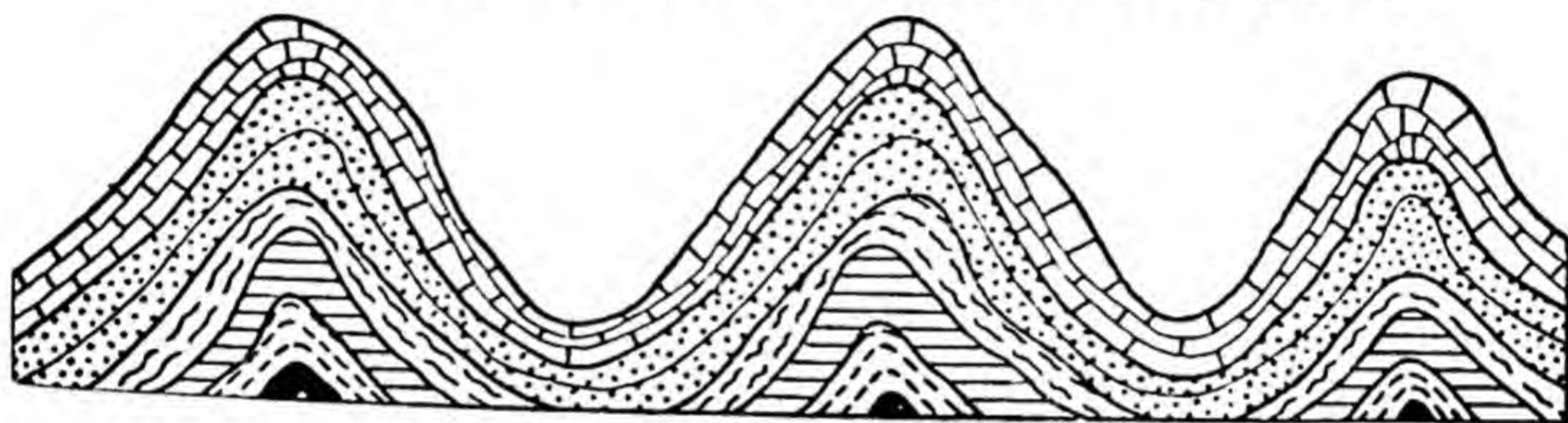


FIG. 5. Fold-mountains.

The surface of the Earth is undergoing constant change. In past ages mountain-building movements resulted in the formation of ranges, such as the Andes and the Rockies of North America, which were caused by the wrinkling of the Earth's crust. Mountains of this type are known as *fold-mountains* (Fig. 5).

If we take a sheet of cardboard and bend it gently upwards it will probably crack at the bend. In a similar way the crests of fold-mountains have been weakened, and it is in such regions that most of the world's volcanoes are found. There are more active and extinct volcanoes in the Andes, and the other fold-mountains that margin the Pacific Ocean, than in any other part of the world.

Volcanoes may be regarded as safety valves through which steam, gases, molten rock (lava), dust, ashes, and other matter are ejected from the heated interior of the Earth. The

neck of the volcano, up which materials are forced by the enormous pressure below, may be compared to the stem of a funnel leading to the bowl which forms the *crater*. The cone is built of the material thrown up by the volcano during eruptions. Some volcanic cones are composed entirely of cooled lava: others mainly of ash, called *tuff*, and other fragmentary matter that has been ejected.

Volcanic eruptions are often associated with *earthquakes*,

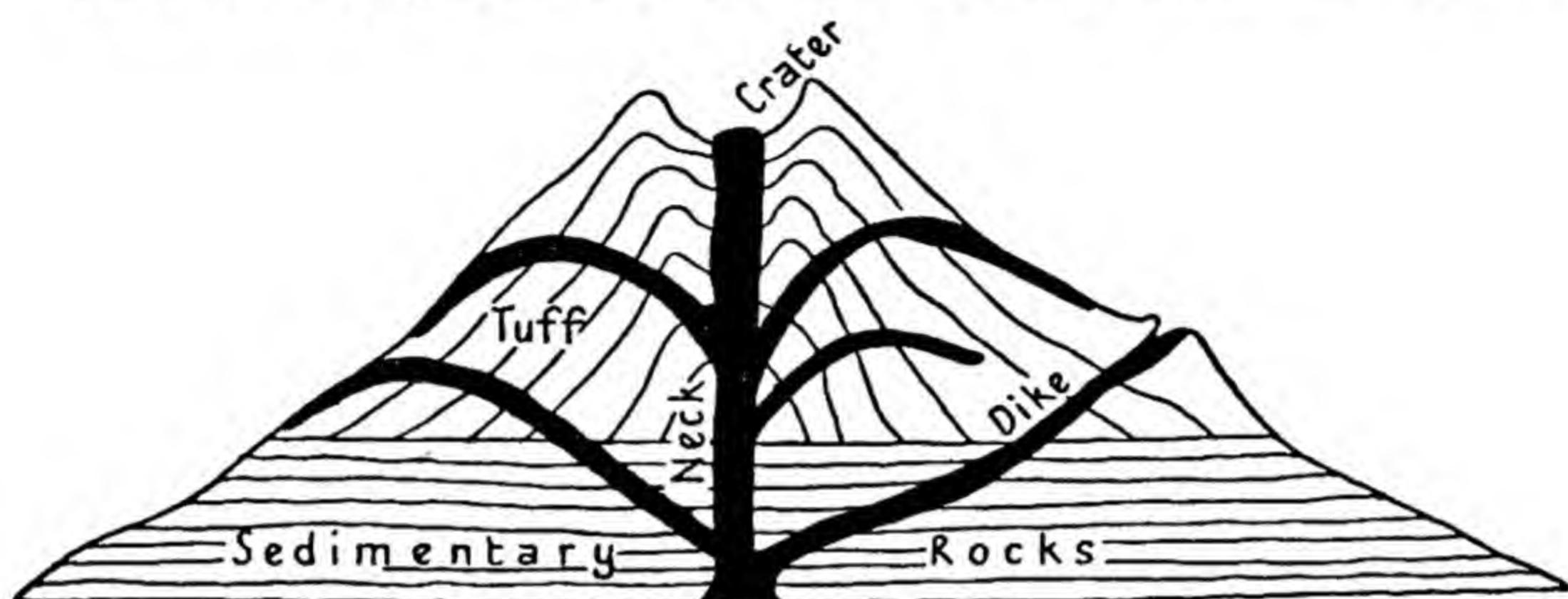


FIG. 6. Section of a volcano.

which are common in the Andes and other fold-mountain areas. It is probable that both phenomena have their common origin in deep-seated Earth movements. Such movements may in themselves be slight: a few inches up or down is the maximum of the greatest earthquake ever measured on a seismograph, the instrument used for recording the force of an earthquake. Yet the vibrations these movements set up is very great indeed. The more violent earthquakes, such as that which, in January 1939, occurred in Southern and Central Chile, do tremendous damage and inflict terrible loss of life.

The Eastern Highlands

Nature not only builds up but also wears away the Earth's surface. Sometimes, as in the case of volcanic eruptions and earthquakes, she acts with dramatic sudden-

ness, but usually the changes that take place are gradual, often covering hundreds of thousands of years, or even more than a million. In the course of ages even the highest mountains are worn down by the action of ice, running water, rain, wind, heat, and frost. The softer rocks are removed, leaving the harder ones standing as peaks or plateaux.

The Eastern Highlands are not nearly so high as the Andes. Nor is their scenery so majestic. Yet the Guiana

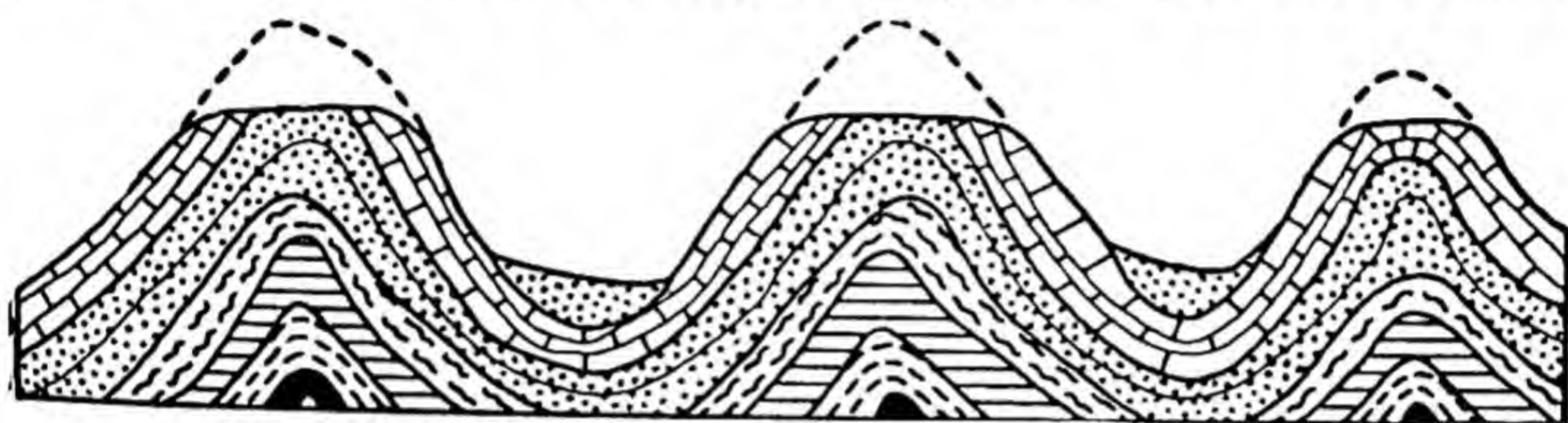


FIG. 7. Residual mountains (compare with Fig. 5).

and Brazilian Highlands are far older than the fold-mountains of the west, for they are the remains of former ranges that have been worn down and planed away by the action of the weather. Highlands formed in this way, which are the residue of much greater mountains, are called *residual mountains* (see Fig. 7).

Wonderful Waterways

Owing to the position of the Andes, the main watershed of South America lies relatively close to the west coast, and so all the great rivers of the continent flow into the Atlantic. The Pacific streams, short and swift, are useless for navigation, but along the coast-lands of Peru their waters are used for irrigation and, in some cases, have been harnessed to generate electricity.

The lofty ranges which encircle the Plateau of Bolivia prevent the rivers in this region from reaching the ocean, and it forms an area of *inland drainage*.

South America is fortunate in her rivers, for the Amazon

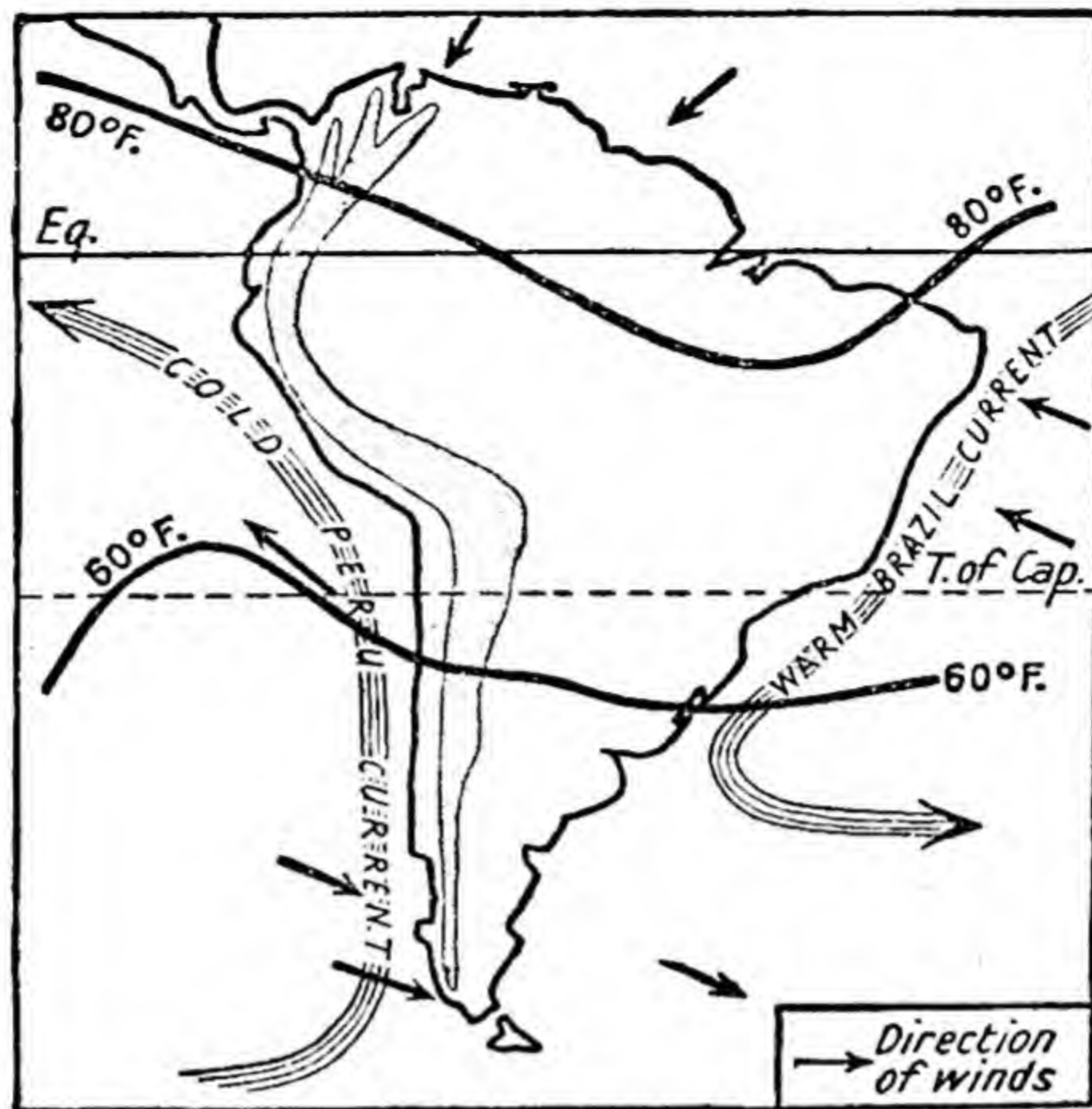


FIG. 8. South America: July Temperature.

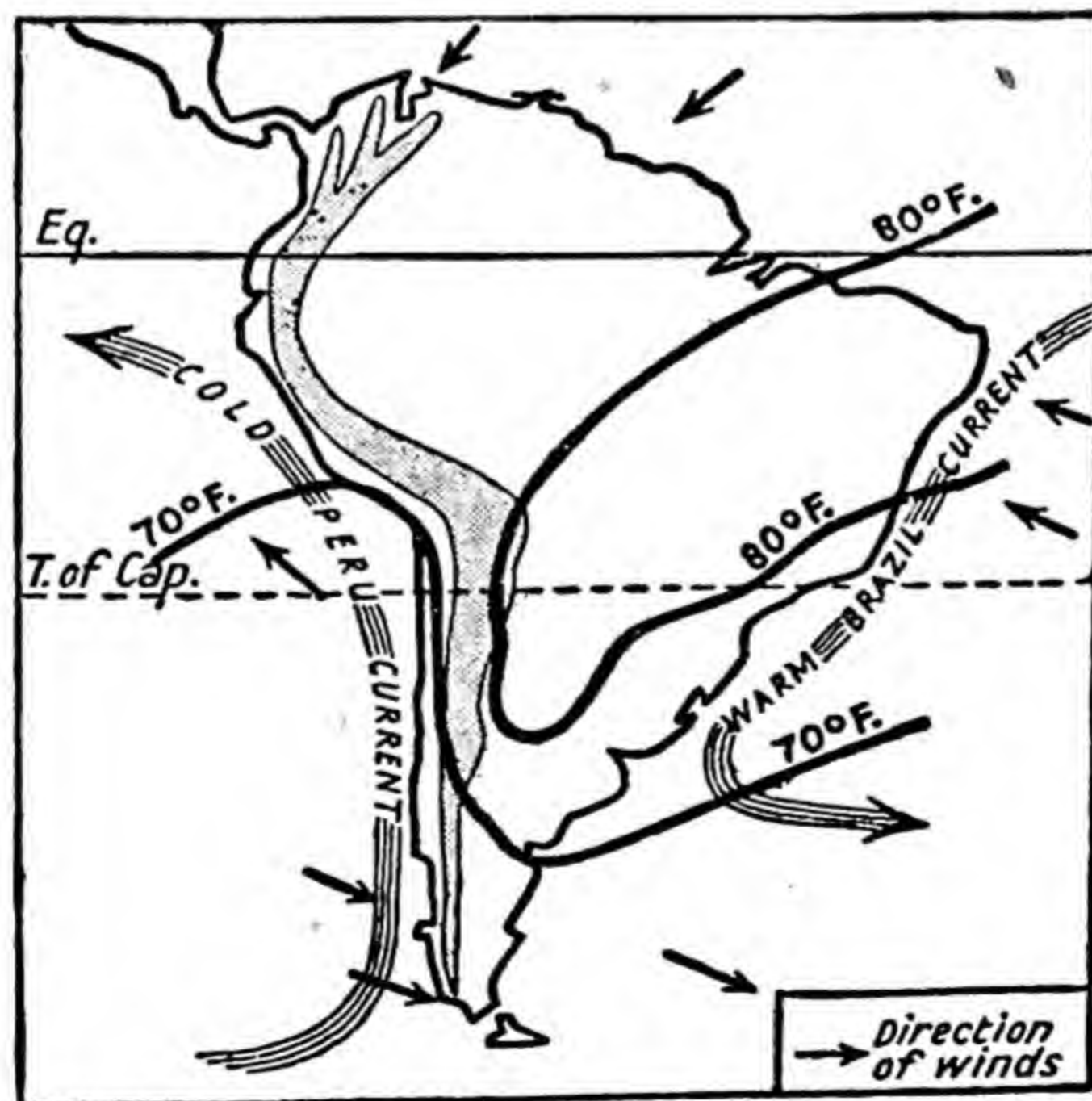


FIG. 9. South America: January Temperature.

(4,000 miles long), the Orinoco (1,200 miles), and the Parana-Paraguay and the Uruguay, which pour their waters into the Plate estuary, are all navigable for many hundreds of miles. Greatest of these waterways is the Amazon, one of the longest rivers in the world, whose rain-drenched forests cover two-thirds of Brazil, a country sixty-four times the size of England. In the whole of this vast basin there are few roads or railways, and transport is carried on mainly by means of the main stream and its tributaries. Ocean-going steamers can ascend the Amazon for 1,000 miles to Manaus, and somewhat smaller vessels can actually travel up stream for another 1,000 miles. The chief river between the estuary of the Amazon and that of the Plate is the São Francisco, navigable for 900 miles above the falls by which it descends from the Brazilian Highlands to the coast-lands.

Climature

South America is widest about 5° S. and, owing to its tapering shape, about two-thirds lies within the tropics. The climate of the continent is greatly affected by this fact, by its compactness, and by the elevation and direction of the Andes, which form a climatic barrier between east and west.

Temperature. On the maps (Figs. 8 and 9) temperatures are shown by isotherms. The word *isotherm* is derived from two Greek words, *isos* meaning equal, and *thermos*, heat. Hence *an isotherm is a line drawn on a map joining places of equal temperature*. But the isotherms do not show the actual temperature of a place, but what it would be if that place were at sea-level. Over most of the Amazon lowlands the isotherms show us the approximate temperature, but in the Andes, for example, allowance must be made for the elevation. The temperature decreases 1° for every 300 feet of ascent.

Find Quito and Para on your atlas. Quito is 9,350 feet above sea-level; and though it lies almost on the Equator,

its average (or mean) temperature is only 55°F. , or equal to that of a warm spring day in England. Para, in almost the same latitude, lies practically at sea-level, and its mean temperature is 78°F. , or higher than that of a hot summer day in England (see Fig. 10).

As South America is so compact the ocean has less moderating effect on the temperature than would otherwise be the case. This is especially noticeable in the tropical belt where the continent is broadest. In this region, because the



FIG. 10. Para and Quito: Temperature and Elevation.

sun shines down more or less directly throughout the year, it is always hot except in the highlands.

In the tropical belt temperatures vary little, and in both the lowlands and highlands the *annual range*, or the difference between the highest and lowest temperatures, is small. At Quito the highest monthly temperature is 55°F. , the lowest 54.3°F. , or a difference of less than 1° . At Para the difference is somewhat less than 3° .

In the temperate belt, south of the Tropic of Capricorn, where the continent tapers, the ocean has a greater moderating effect on the temperature.

The maps (Figs. 8 and 9) show that the warm Brazilian Current flows south along the east coast of South America, and the cold Peru Current north along the west coast as far as the Equator. *Ocean Currents*, by warming or cooling the winds blowing over them, increase or decrease the temperature of adjacent lands. Thus the cold Peru Current lessens the temperature of places along the west coast, and the warm Brazil Current increases the temperature of places along the east coast. Iquique, on the west coast, is

no warmer than Bahia Blanca, on the eastern seaboard, about 1,200 miles farther from the Equator.

Pressure and Winds. Wind is air in motion. The chief cause of wind is difference in atmospheric pressure. If we

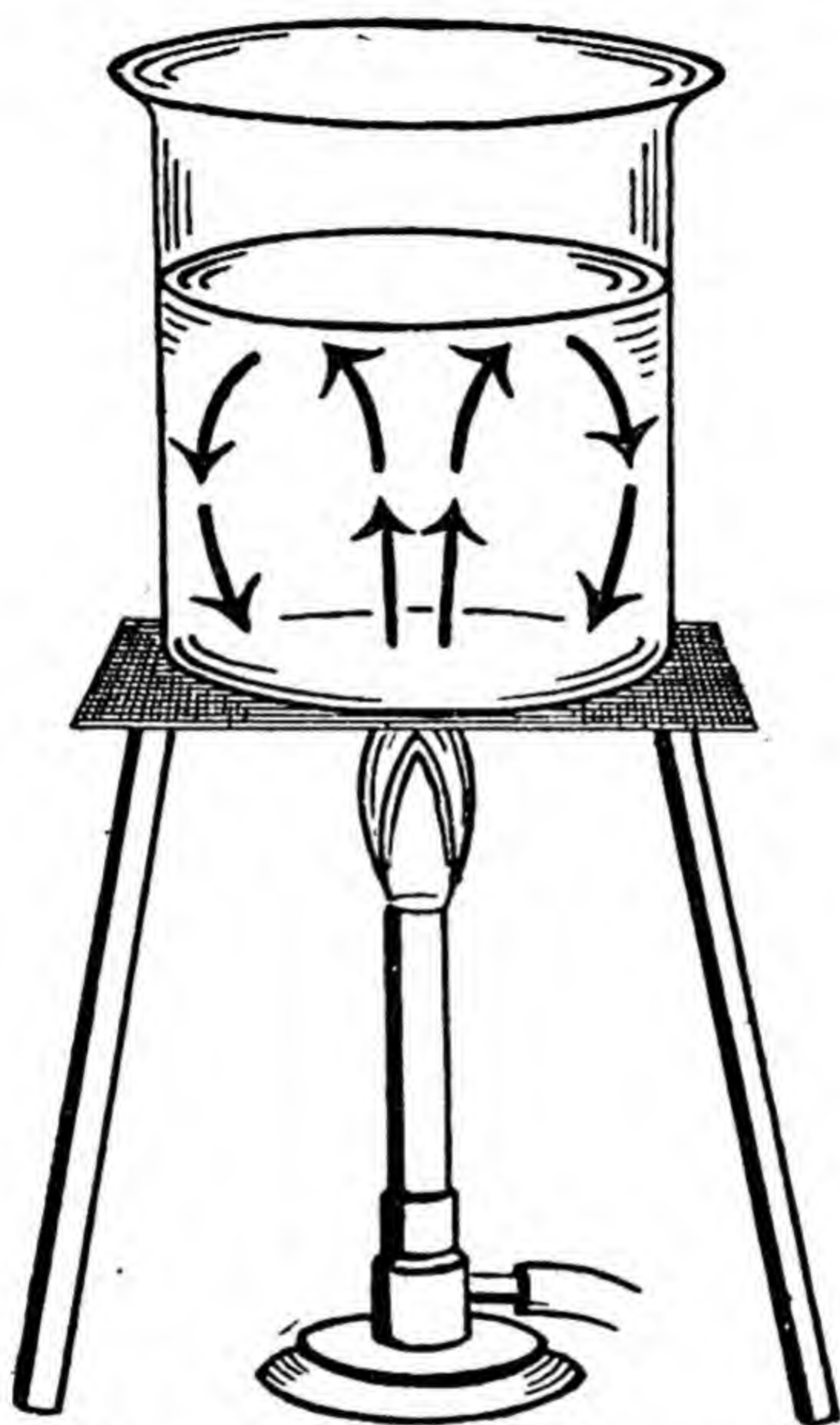


FIG. 11. Beaker with burner.

pump up a tyre its walls become quite firm, because the air we put into it exerts pressure. When we open the valve and allow the air to escape, so releasing the pressure, the tyre hangs loosely in folds.

Take a tumbler and fill it quite full of water. Now place a piece of cardboard on it so as to cover the top completely. Place your hand on the cardboard and invert the tumbler. Now take your hand away and you will find that the card-

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board remains in place. Why is this? It is because of the pressure of the air upon the cardboard.

Pressure varies greatly over different parts of the Earth's surface, and from day to day over any particular district. Sometimes the pressure is high: sometimes it is low.

If we take a beaker of water and heat it, we shall find that the water at the bottom, which becomes warm first, rises to the surface, where it becomes slightly cooled, and flowing

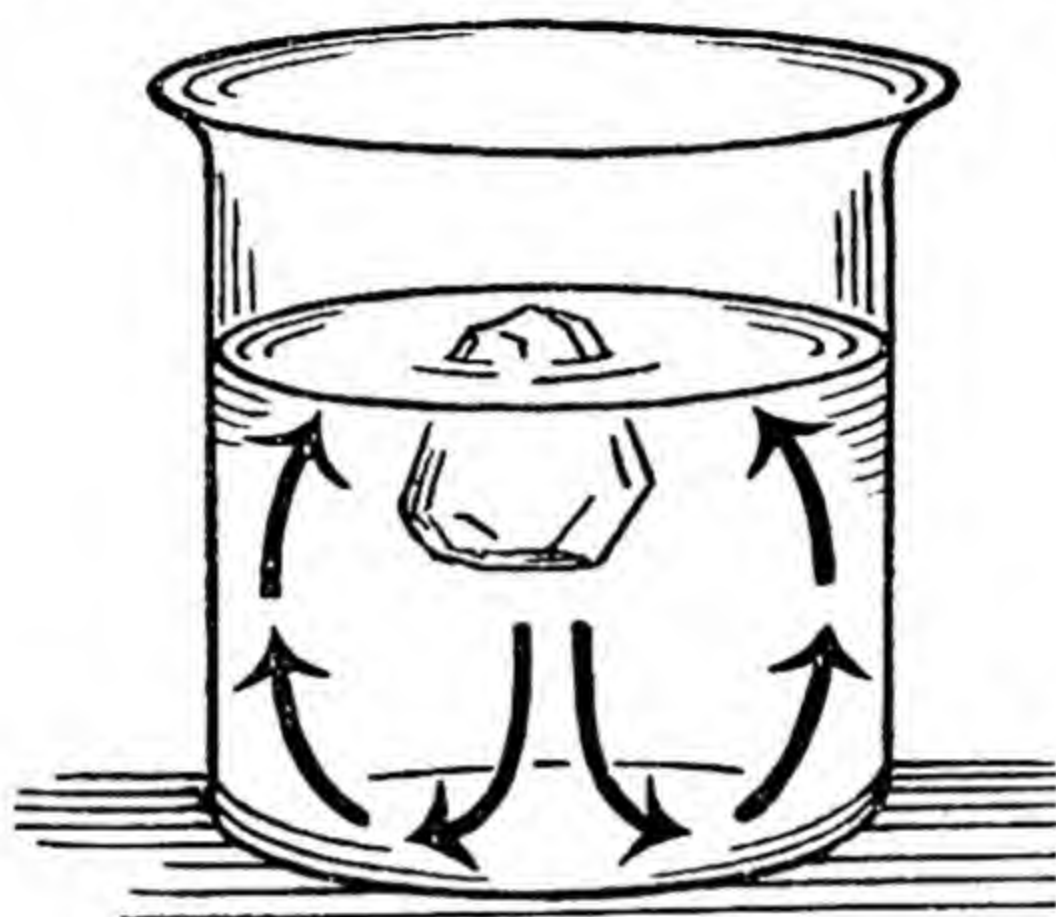


FIG. 12. Beaker with ice.

outwards towards the edge, sinks to the bottom of the beaker (see Fig. 11).

Now take a beaker, fill it with cold water, and put a lump of ice into it. The water beneath the ice is chilled and sinks to the bottom where it becomes a little warmer. But the descending layers of cold water from above push out this warmer water, which flows outwards towards the edge of the beaker, and rises up the sides (see Fig. 12).

All liquids, including air, behave in much the same way as the water in the beakers. Hot air rises: cold air sinks. The belt around the Equator is always hot, and as the hot air expands it becomes lighter and rises, forming a region of *low pressure*. Ascending air currents over hot regions are called *convection currents* (see Fig. 16). They are most marked in the equatorial belt, though they are not confined to this region.

As the air rises over the equatorial belt it is gradually cooled, flows north and south away from the Equator, and sinks to the Earth again about latitudes 30° N. and 30° S. In these regions there are permanent belts of *high pressure* from which the air flows outwards, part towards the Equator, and part towards the Poles.

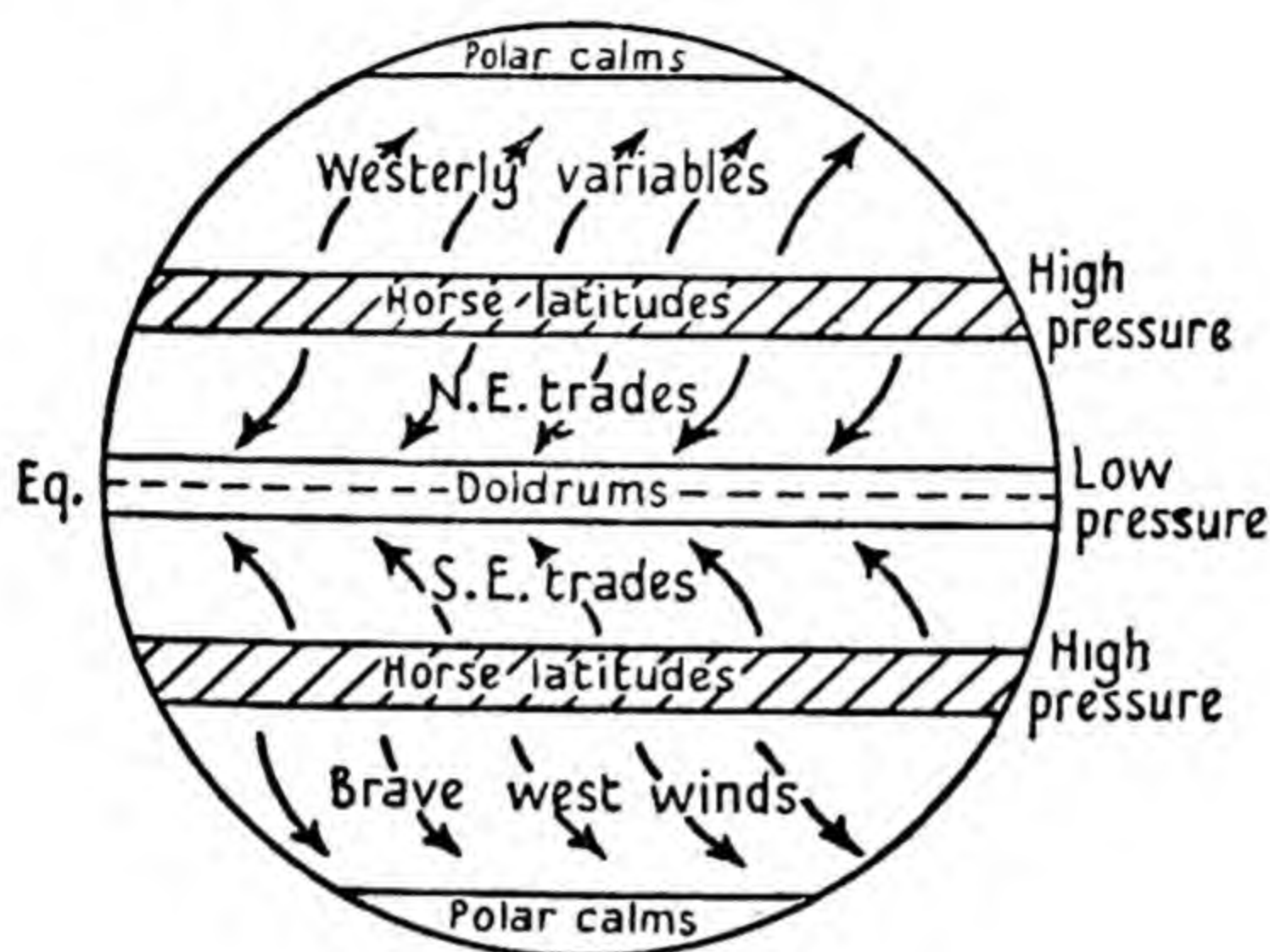


FIG. 13. Wind belts.

The Wind Belts. The early seamen soon discovered that there were four well-marked belts of winds blowing over the Earth's surface; and they also learned to dread the belts of Calms, such as the hot steaming belt of the *Doldrums* around the Equator and the *Horse Latitudes* of the high-pressure belts about 30° N. and 30° S.

It is important that we should learn how these winds blow, for they have a marked effect on climate. Note that the winds flow from the high-pressure belts, about 30° N. and 30° S. (i) towards the low-pressure belt around the Equator, and (ii) towards the Poles. But, owing to the rotation of the Earth, the winds do not blow due north and south, but are deflected to the right in the Northern Hemisphere, and to the left in the Southern Hemisphere. Fig. 13 shows the direction of the principal wind belts of the world.

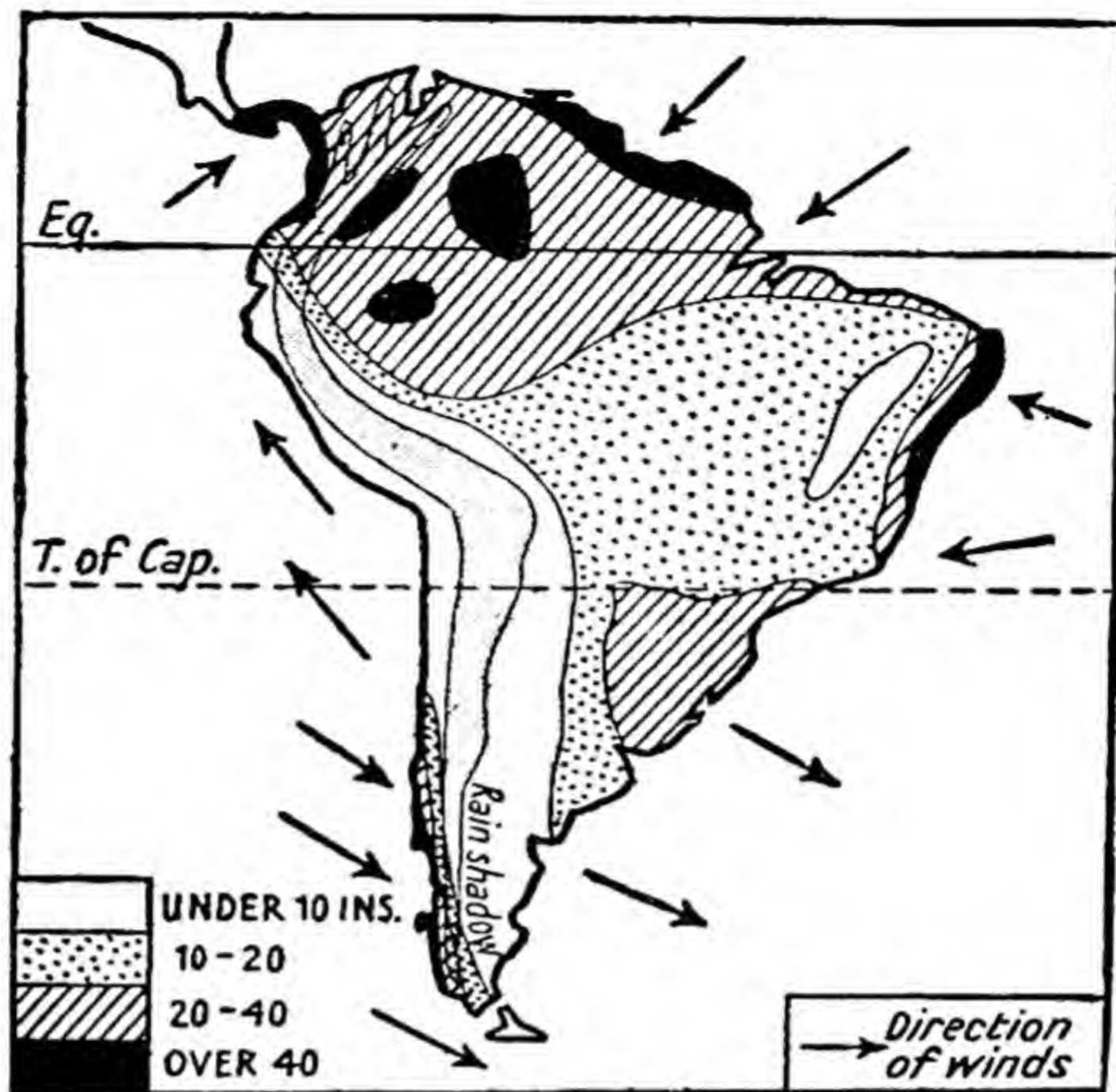


FIG. 14. South America: Rainfall
May to October.

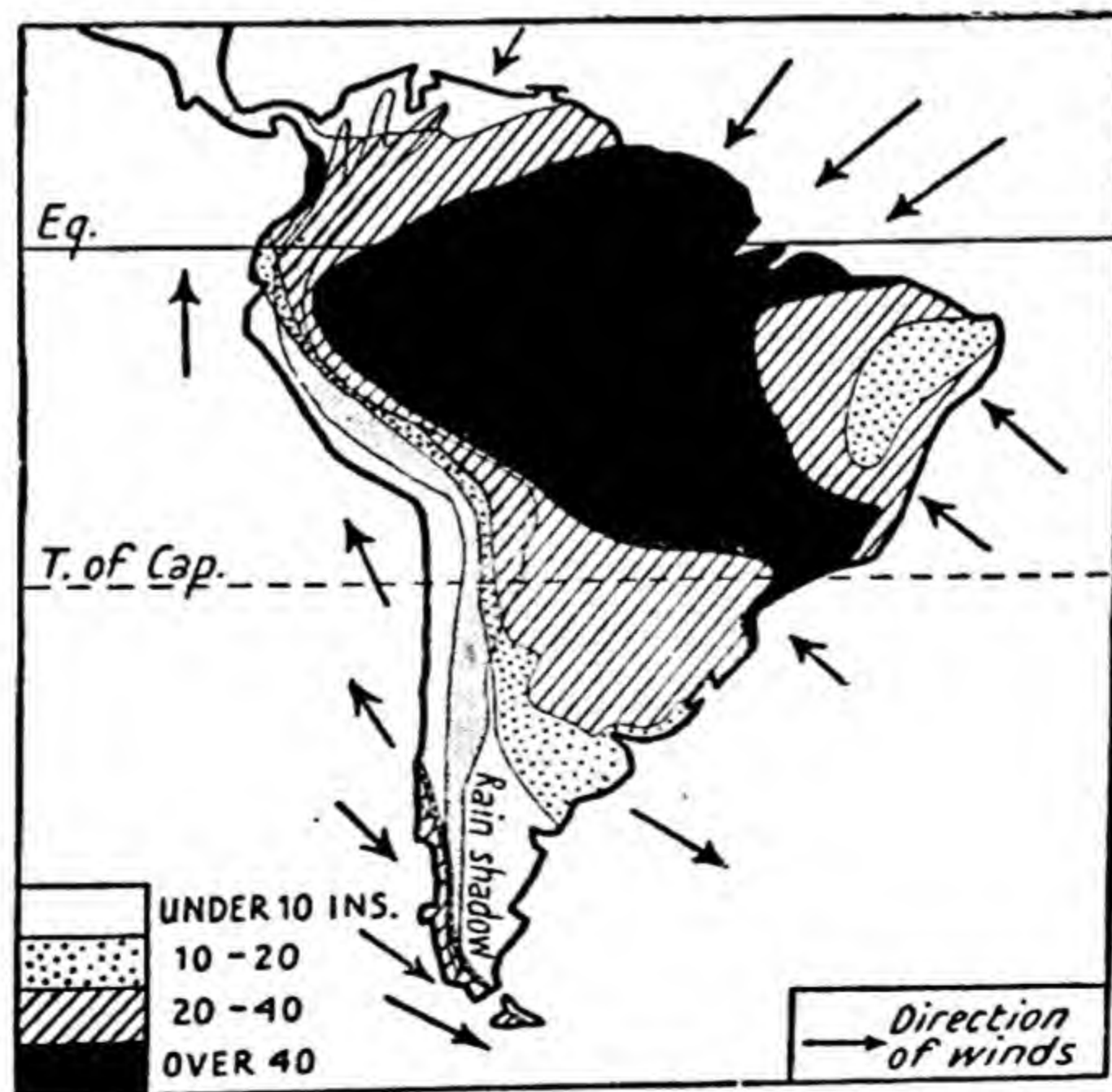


FIG. 15. South America: Rainfall
November to April.

Winds and Rainfall. The whole of the Amazon basin receives a very heavy rainfall. But as the greater part consists of lowlands, it is obvious that the rainfall is not due to relief, as it usually is in the British Isles, but to some other cause. We know that (i) hot air can contain more moisture than cold air, and (ii) when air is cooled some of the moisture in it is condensed and falls as rain. As the constant North-East and South-East Trade Winds blow towards the

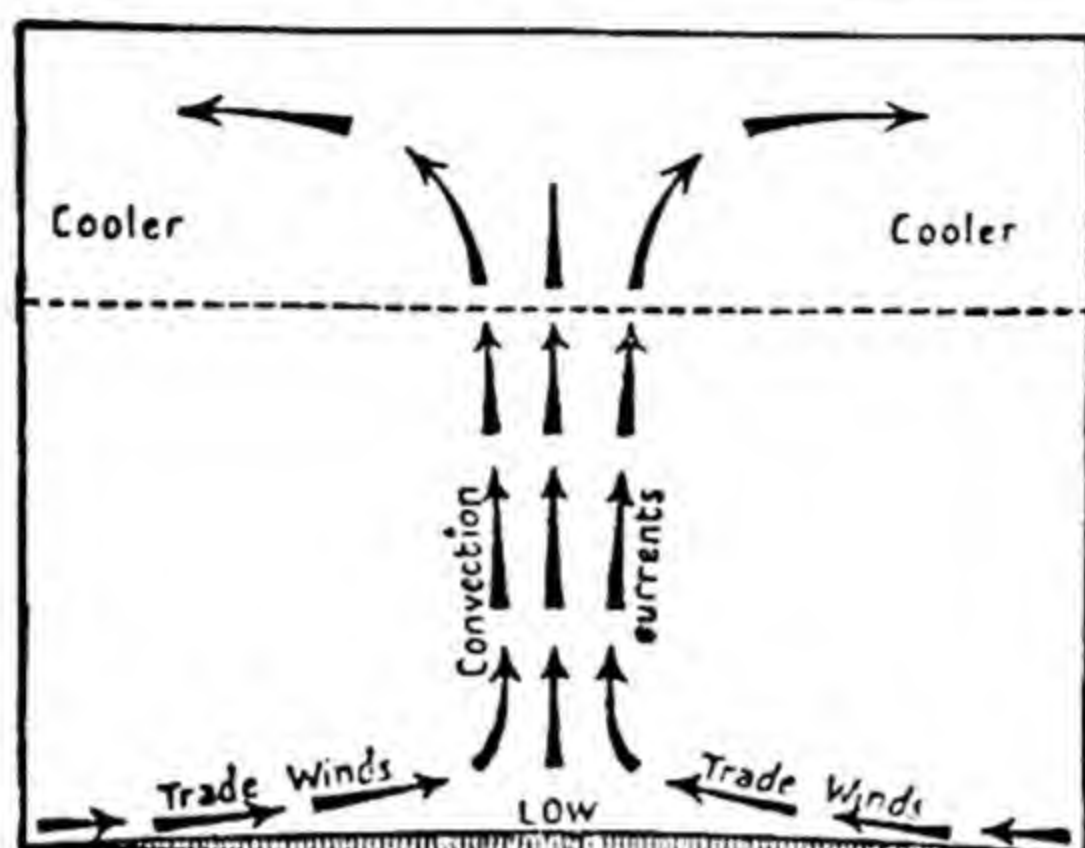


FIG. 16. Convectional rains.

hot region around the Equator, they become hotter and hotter, and in their passage over the Atlantic gather an increasing amount of moisture. The heated air in the equatorial belt, rising into cooler regions, causes rain. Thus the rains are due to convection currents (see p. 20) and are known as *convectional rains*. Because the air is continually rising it rains practically every day. Evaporation is, of course, greatest during the hottest part of the day, when the Sun's rays shine down most directly, and so the rain usually falls in the afternoon during torrential thunderstorms.

The Guianas and the basin of the Orinoco, lying to the north of the equatorial wet belt, and the Brazilian Highlands on the south of this belt, have marked wet and dry seasons, most of the rain falling during the summer months.

The south-west of Chile is a region of rugged relief, where at all seasons the *Brave West Winds* blow on-shore. These winds are forced upwards by the steep mountain

wall of the Andes, whose windward slopes consequently receive very heavy *relief rains*.

But the region on the leeward eastward side of the Andes lies in the *rain shadow* of the mountains. This means that it receives little rain because: (i) the winds have parted with much of their moisture on the windward slopes and so are relatively dry when they descend to the leeward side; and (ii) in descending they are compressed and become warmer instead of cooler, thus absorbing moisture rather than depositing it.

Now examine Figs. 14 and 15. In Northern Chile, and along the adjacent coastlands of Southern Peru, the winds blow off-shore or parallel to the coast. Consequently they are dry winds. The whole of this part of the west coast, lying on the leeward side of the Andes, is an arid and desert region. The long narrow Atacama Desert, crossed by the Tropic of Capricorn, is rainless. It is one of the driest regions in the world. Such desert areas are found, in the same latitudes, on the western sides of all the continents.

Central Chile, lying between the desert belt to the north and the rainy region to the south, receives rain in winter from the on-shore Brave West Winds, but in summer it is dry, for at this season it lies in the belt of the South-East Trades which blow off-shore. A climate of this type, with hot dry summers and mild rainy winters, is called a *Mediterranean Climate* because it reaches its greatest extent in the lands round the Mediterranean Sea.

Natural Vegetation

In South America there is a very close connexion between the rainfall and temperature and the natural vegetation. The amount of rainfall required for plant life depends largely on the temperature. In cool regions there is much less evaporation than in the tropics, and so less rainfall is needed to keep the sub-soil moist. In the temperate zone an annual rainfall of from 20 to 25 inches is sufficient

for trees, but in tropical regions, owing to the higher temperatures, a far heavier rainfall is required for forest growth.

Tropical Forests cover the whole of the hot and rain-drenched lowlands of the Amazon, and the coastal lands of the Guianas, Venezuela, Colombia, and Ecuador. The very luxuriance of the vegetation makes land transport difficult, and is a hindrance to cultivation, for weeds and wild plants grow so rapidly that they tend to choke the crops.

The Savannas. North and south of the *selvas* of the Amazon lowlands, the Guiana and Brazilian Highlands and the greater part of the Orinoco basin are covered with savannas, known as *campos* in Brazil and *llanos* in the Orinoco region. Owing to the heat, the great evaporation, and the length of the dry season, there is insufficient moisture for thick forests, and grass and trees grow scattered amidst bare stony patches. Soon after the summer rains begin the grass grows rapidly, springing up in clumps. The trees are of a drought-resisting variety, for they must be able to withstand the relatively cool and dry period that follows the wet season.

In the south-west the Brazilian Highlands descend to the lowlands of the upper Parana and the Paraguay, where are found the *warm temperate forests* of the *Gran Chaco*, a little-known and almost unexplored region, covered with palm groves, forests of hard wood, grassland, and unhealthy swamps and jungle. Considerable portions of the highlands of South-East Brazil, lying in similar latitudes to the Gran Chaco, are, however, clad with *coniferous forests*.

The pampas of the Argentine and Uruguay stretch from the Atlantic to the foot-hills of the Andes. Though the rainfall is sufficient for grass it is not enough for trees, which are not found except in specially favoured localities. The pampas, like the grasslands of the High Veld of South Africa, and those of the Murray-Darling basin in Australia, have warmer summers and milder winters than the

corresponding areas in the Northern Hemisphere which lie somewhat farther from the Equator.

Vegetation Zones of the Andes. If we leave the hot wet forests of the Amazon basin and climb the eastern slopes of the Andes we pass gradually into the cooler forests of the *Montaña* region which are reached at a height of about 5,000 feet. Here grow such trees as the *chinchona* whose bark yields quinine, and *coca* bushes from whose leaves the drug called cocaine is obtained. In the still cooler region, above 9,000 feet, the forests merge into alpine pastures which pass through tundra to perpetual snow. At the Equator the *snow-line* is reached at about 15,000 feet, but in the south of Chile it descends to within 3,300 feet of the sea.

The West Coast. From the Isthmus of Panama to the Gulf of Guayaquil the lower parts of the Andes are clad with dense wet forests. But south of the Gulf the winds blow off-shore: the slopes of the mountains become more and more arid until in the Atacama Desert there is practically no vegetation. Farther south *Mediterranean vegetation* is found in Central Chile. Most of the trees and shrubs are evergreen with small, tough, hairy or oily leaves which prevent undue loss of moisture and so enable them to withstand the dry summers. In Southern Chile *coniferous* and *deciduous forests* clothe the lower slopes of the rain-drenched Andes.

EXERCISES

1. How are fold mountains formed? Give two examples. Why are volcanoes frequently found in such regions? Name one active and one extinct volcano in the Andes.

2. Name three desert areas in the Southern Hemisphere. Draw a sketch-map, adding any notes you think necessary, to show why the desert area you have named in South America receives practically no rain.

3. Give one example from South America of each of the following climatic regions, and in the case of *two* of them show how the natural vegetation is influenced by the rainfall and temperature: (i) Very hot

CHAPTER III

THE GUIANAS

Three European Colonies

IF we were to travel up the Amazon to Manaos, and then continue our journey up the Rio Negro, we might pass by way of the Cassiquiare into the Orinoco, returning down that river to the Atlantic. The area enclosed by these streams and the ocean forms the island of 'Guiana', an Indian name meaning 'the watery land'. Much of this region lies in Venezuela, part in Brazil, but the most accessible and best-known portion is formed by the three European Colonies of British, French, and Dutch Guiana lying along the Atlantic seaboard.

The Guianas are not called the watery land without good reason, for stretching inland from the low-lying coast is a swampy plain built up of alluvium brought down by the many rivers. Farther inland the ground rises gradually to the Guiana Highlands, of which the highest and most extensive portion lies in Venezuela.

Many rivers, like the Essequibo, form falls and rapids where they descend from the plateau to the lowlands. Most famous of these cascades are the Kaieteur Falls, which rank with the Niagara and the Victoria Falls in majesty and beauty; but few white people have ever seen them, for they lie in the heart of the forests drained by the Potaro River, a tributary of the Essequibo. In the Kaieteur Falls Nature has fashioned her work on a scale so immense that it overwhelms the beholder with a sense of awe, as he gazes up at the mighty sheet of water hurling itself over a sheer precipice, and plunging, amidst clouds of spray, into the tossing, seething whirlpool far beneath. Well do the Indians call these falls 'The God of the Waters', for they are almost 300

feet wide and have a drop of 741 feet, or nearly five times the height of Niagara.

As the Guianas lie just north of the Equator, in the track of the North-East Trades, they are hot and wet throughout the year. They may be divided into three regions: (1) the cultivated Coastal Plain from five to ten miles wide; (2) the Forest Belt of the interior; and (3) the Highlands.

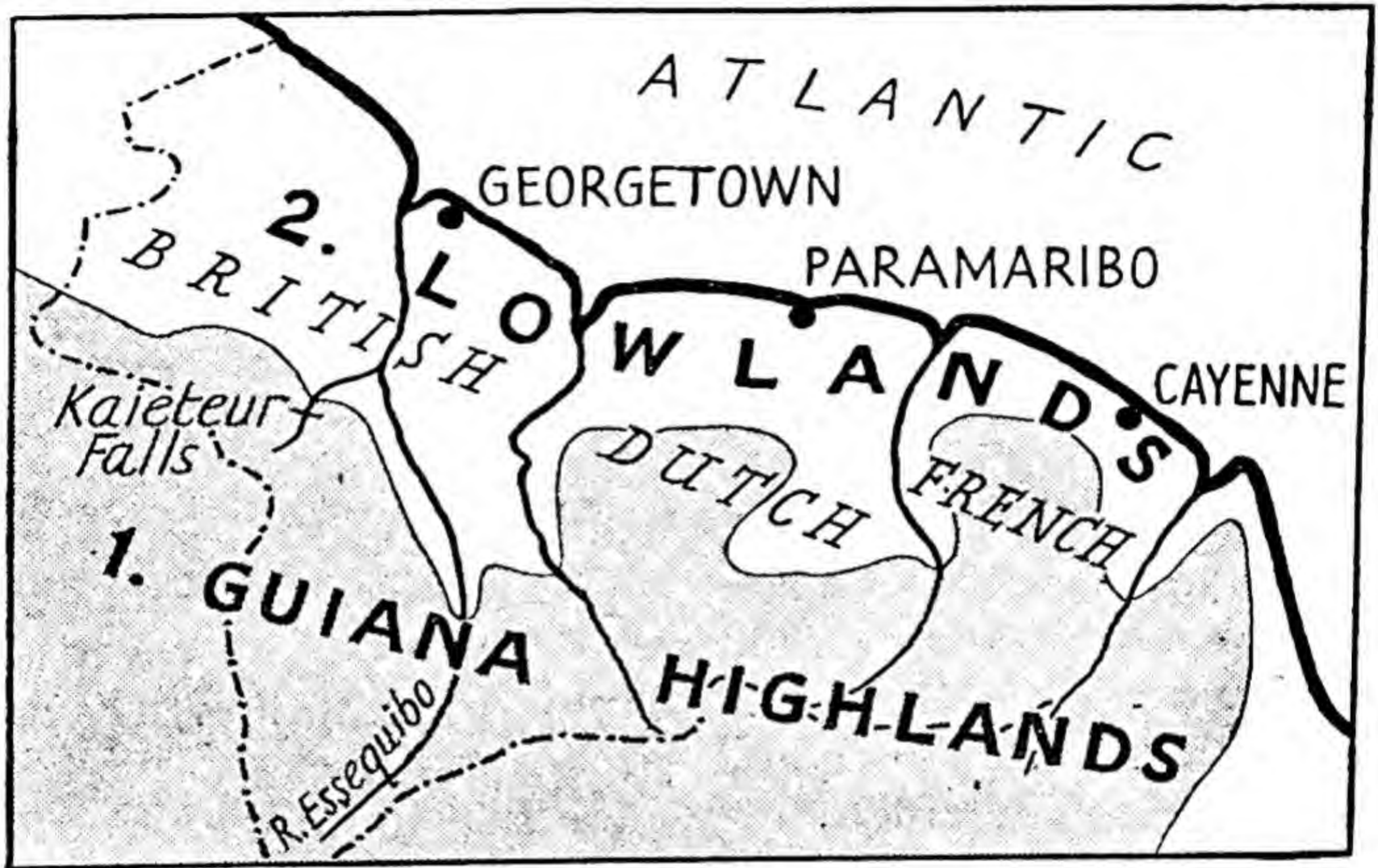


FIG. 18. The Guianas.

The higher parts of the Highlands are clad with savannas on which some cattle are grazed, and where a certain amount of coffee is cultivated at elevations ranging from 2,000 to 3,000 feet. The Forest Belt contains valuable timber, such as mahogany and greenheart, whose wood, stronger than teak and almost as hard as quebracho, is greatly in demand for making piles, dock gates, the keels of boats, and the hulls of ships. From the sap of the balata tree rubber is obtained.

The 'front lands', as the coastal strip is called, lie below the level of the sea, which is kept out at high tide by embankments built by early Dutch colonists. Wide stretches

of this marshy land have been drained by cutting canals, and districts once consisting of mangrove swamps have been planted with sugar-cane, rice, and coconut palms.

Native Tribes and Asiatic Immigrants

When the Spaniards, and later the Dutch, English, and French colonized the Guianas they found there Indians belonging to various tribes, including the peaceful aboriginal Arawaks and the warlike Caribs, whose name is perpetuated in the Caribbean Sea. A few of their descendants still exist as distinct races in the Guianas to-day. Their *benabs*, or huts, are thatched with palm leaves: in the Forest Belt the sides are left open, but on the more exposed savannas they are closed in. The Swamp Indians build their *benabs* on raised platforms out of reach of floods and damp. These huts are sufficient to provide shelter from the heavy rains and blazing sun, and fresh ones are easily erected when the Indians move to new hunting and fishing grounds. The savannas are the home of the Mascuis, the most handsome and attractive of all the Carib tribes, who are skilful hunters, their weapons consisting of blowpipes and poisoned darts.

Most of the population of the Guianas consists of Asiatic immigrants—East Indians, Javanese, and Chinese—employed on the plantations, together with negroes who are descendants of freed slaves. The Europeans, relatively few in number, are of British, Dutch, French, and Portuguese stock.

British Guiana

Though British Guiana is almost the same size as Great Britain, its population is scarcely as great as that of Bristol. Like the neighbouring Dutch and French colonies it consists of Highlands and a coastal plain crossed by many rivers, most of which enter the Atlantic through deltas. The Essequibo and its tributaries drain more than half the country, but the Demerara is the most important stream.

Around the Demerara River the low-lying *Coast-lands*, protected by dykes from the sea, are planted with sugar-cane, which is the chief cash crop. When seen from the air, the small rectangular plantations, separated from each other by wide canals, and intersected by smaller channels also cut for drainage purposes, look rather like a huge chessboard. When the workers have gathered the canes, they place the bundles on their heads, and carry them to iron punts, moored on the canals, in which they are taken to factories where they are converted into refined sugar, molasses, and rum.

Much rice is planted in the Coast-land region. Many of the coolies are East Indians, immigrants from India who comprise about a third of the population of British Guiana. They work hard tending the rice which is their staple food, and provides a surplus for export, mainly to the West Indies. First wooden ploughs, drawn by oxen, churn up the mud and so prepare the ground for planting. The seedling plants are set out in the ooze, and soon the fields are a mass of emerald green. When the green changes to yellow the plots are drained, and soon the rice is gathered, dried, and taken to the threshing-floor, where it is trodden out by oxen or beaten with flails.

Georgetown, the port-capital of British Guiana, stands at the mouth of the Demerara River, and as it lies below sea-level, a wall, about a mile long, has been built to protect it from the ocean. When approached from the Atlantic, little can be seen of the town except the masts of the wireless station and the tall tower of the market. Nearly all the houses are built on piles driven far into the swampy ground, and their white walls, contrasting with the vivid green trees, that border the broad streets, add brightness and charm to the city.

The Highlands. Cattle are reared on the higher parts of the Coast-lands and also on the savannas of the upland belt rising behind and above the forested lowlands. In the

Highlands gold and diamonds are found in the upper courses of many of the rivers. Most of the *placer mining*, as it is called, is done by little groups of negroes. The gold-bearing gravel is placed in a long shallow trough called a *tom*, at one end of which is a screen set at an angle of 45° . Streams of water are run through the trough, and these force the particles of gold through the fine mesh of the screen into a box containing quicksilver, which causes them to collect together. The gravel remaining behind in the *tom* is afterwards carefully sorted, for it may contain a gold nugget.

Diamond mining is carried out in a similar way. Many ages ago the diamonds were formed in the volcanic rocks higher up amidst the mountain streams, but the rivers have been constantly at work wearing away the rocks, carrying the sediment down stream, carving out ever deeper and deeper channels, and leaving terraces at higher levels, often far above their present beds. It is in the soil of these terraces that most of the diamonds are found. Sometimes a *tom* can be used to separate the diamonds from the gravel; but where the precious stones lie at greater depths, they must be separated from the rock by machinery.

Mining for gold and diamonds on a large scale is carried out by companies, so too is the work in the *bauxite* mines. This mineral is the chief source of aluminium. Though light, aluminium is equal in strength and hardness to any metal except steel, and for this reason it is widely used in the manufacture of aeroplanes, airships, and motor-car parts, as well as for humbler but equally useful things like kitchen utensils.

Dutch Guiana

Though Dutch Guiana is about five times the size of Holland, its population is only a fifth that of Amsterdam, the largest city in the homeland. The natural vegetation and products resemble those of British Guiana. Sugar, rum, and coffee are the chief exports; others are gold and bauxite.

In addition to Indians, negroes, and Chinese, there are a number of Javanese settlers who have come from the Dutch island of Java. One-third of the population live in *Paramaribo*, the capital and chief port, some miles up the Surinam river. With its canals, and its houses built in a Dutch style, with wooden walls and tiled roofs, the town is very like one in Holland.

French Guiana

This French colony is the smallest, most thinly peopled, and least developed of the Guianas. About the size of Scotland, its total population is little more than that of a fair-sized English market town. It is unpopular with the French people, partly because of its unhealthy climate, but also because the worst criminals in France are sent to the convict station at 'Devil's Island', some 27 miles from *Cayenne*, the port-capital. Some coffee, cacao, rubber, and hides are exported to Marseilles.

EXERCISE

(a) Into what regions would you divide the Guianas? (b) Confining your answer to British Guiana, describe the climate and products of one of these regions.

CHAPTER IV

BRAZIL AND THE AMAZON

A Country as large as a Continent

THE Federal Republic of Brazil is larger than Australia, almost as big as Europe, and ninety-two times the size of Portugal, of which it was once a colony. Its area far exceeds that of any other state in South America; its frontiers touch those of every other country in the continent with two exceptions (which are they?). Yet despite its immense size, the population of Brazil does not exceed that of the British Isles. The forested and unhealthy Amazon lowlands, comprising half the country, are quite unsuited to close settlement; and the high and healthy Brazilian Highlands are as yet little developed. Most of the inhabitants of Brazil live in the Coast-land region, which stretches for some 5,000 miles along the Atlantic seaboard.

Brazil may be divided into three main regions: (1) the *Amazon Lowlands*; (2) the *Brazilian Highlands*; and (3) the *Atlantic Coast-lands* and their margins.

The Amazon: the World's Greatest River

The Amazon, longest river in the world, drains a greater area than any other stream. It also carries more water to the ocean, for as its course lies close to the Equator it flows through the ever-wet belt. Its headstream, the Marañon, rises in the Peruvian Andes, within 150 miles of the Pacific, but as the river is shut off from that ocean by the mountain barrier its waters flow east for 4,000 miles before reaching the Atlantic. Fed by melting snows and heavy rains, the Marañon descends through steep gorges, ever cutting its way deeper and deeper into the mountains. Laden with sediment, and carrying stones, rocks, and boulders along

its bed, the swiftly flowing river, after a course of over 1,000 miles, plunges over the Manserriche Falls and, turning eastward, enters the densely forested lowlands.

After its confluence with the Ucayali, the Marañon becomes the Amazon proper. The lowlands, at one time probably an arm of the Atlantic Ocean, have been built up of sediment brought down from the mountains by the

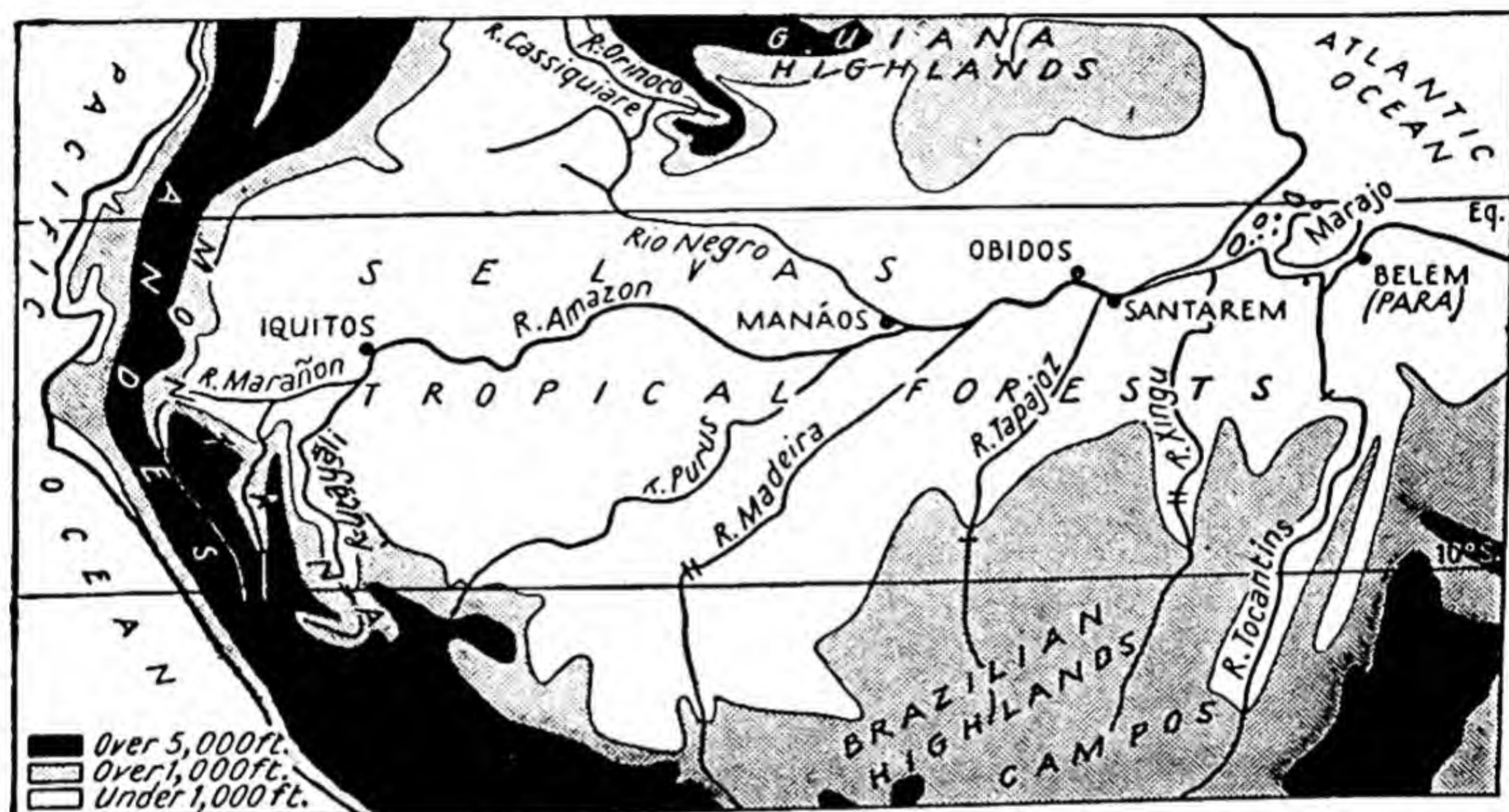


FIG. 19. The Amazon Basin.

Amazon and its numerous tributaries. This great alluvial plain, which extends, almost at sea-level, from the base of the Andes to the Atlantic, is so flat that the Amazon only falls some 40 feet in the last 2,000 miles of its course. Owing to the level nature of its bed and to the volume of water it carries, the river frequently divides into numerous channels, called *igrapes*. Many tributaries descend from the Guiana and Brazilian Highlands to the main stream, forming falls where they tumble over the older, harder, and higher rocks which margin the lowlands. Chief of those entering on the right bank are the Purus, the Madeira, which rises on the eastern slopes of the Plateau of Bolivia, and the Tocantins. The principal left-bank tributary is the Rio Negro, which

derives its name from its blue-black waters that form a striking contrast to the tawny yellow flow of the Amazon itself.

It is interesting to note the different times of flood on the main stream and its tributaries. From March to June, when the Andean tributaries are swollen with water from the melting snows, the Amazon rises rapidly. As its turgid flood rolls onward, it forces back for a time the waters of its tributaries, thus causing them to rise and flow over the surrounding land. Otherwise the level of the river is fairly constant, for the southern affluents are at their highest during the heavy rains of the southern summer, and the northern tributaries during those of the northern summer.

The Amazon enters the Atlantic through a huge delta, crossed by many distributaries, and studded with islands of which the largest is Marajo. The river carries so much sediment that for some 200 miles from its mouth it stains yellow the blue waters of the ocean, which are also rendered less salt for about the same distance.

Life in the Hot Wet Forests. The forests of the Amazon cover an area of 2,000,000 square miles. In the whole of this region there are few roads or railways, and the only way to travel any distance is by boat along the innumerable streams that intersect the dense jungle. Owing to the high temperature and abundant moisture, plant growth is so continuous and rapid that ground cleared of trees is, after a few years, covered again with dense vegetation. Clumps of palms, giant tree ferns, and innumerable other plants, decked with vines and creepers, rise above the thick undergrowth; and the roots of mighty trees, as smooth and shining as the trunks themselves, spread over the damp, moss-covered surface, often developing buttresses that rise 8 or 12 feet above the ground. Gigantic butterflies, looking as if they were clad in rainbows, flit over the water; parrots and loud-voiced macaws fly from tree to tree; monkeys chatter; while alligators sun themselves on mud banks, or

float like half-submerged logs down stream. The rivers are margined by a tangled sea of vegetation beyond which stretches that unknown forest in whose dim recesses live wild Indian tribes.

Here and there, the Brazilian Government has established *attraction posts* where, from some commanding tree, civilized natives talk to Indians concealed in the forest around. After weeks, or maybe months, contact is made and friendly relations established with the shy but fierce tribes. Many of these folk are naked savages who manage to exist by collecting roots and birds' eggs, and killing monkeys and other animals with their bows and arrows or by poisoned darts shot from a blowpipe. They have no permanent homes and wander from place to place in search of food. Others are more advanced. They live in villages beside a stream, building huts on piles so as to be above the reach of the flood waters. The men hollow out the trunks of trees to make dug-out canoes which they use for travelling and fishing. They clear small patches of ground where the women plant plantains (bananas), yams, and manioc. The roots of the manioc shrub, which resemble large turnips, are washed, grated, and heated (to remove the poison they contain) to make tapioca. Some of these more civilized Indians, as well as the *mestizos*, gather nuts and wild rubber which they sell to traders; others work on cacao, sugar, or cotton plantations which have been made in clearings in the more accessible parts of the forest.

The life of a *seringueiro*, or rubber-gatherer, is hard, for the trees from which the latex, or juice of the rubber tree, is obtained, often lie far apart. He makes a slanting cut in the bark of the tree, from which the white milky fluid runs down an upright cut into a cup or tin placed at the base. Sometimes he visits as many as 150 trees on his round, and then returns to each to collect the latex. The *seringueiro* then dips the end of a paddle-like stick into the latex and smokes it over a fire. He repeats the process

until a ball of rubber is formed. When the *biscuit*, as it is called, has reached a fair size, it is added to the growing pile of blackish rubber balls, which are by and by taken to a wooden landing-stage, and collected by river steamer. Such steamers can ascend the Amazon as far as Iquitos, a rubber-collecting centre in Peru, 2,300 miles from the ocean.

Travelling by one of these vessels on its return journey, we pass occasionally a great timber raft, with Indian families aboard, going down stream to the sawmills at Manaus or Para; and sometimes we see huge forest-clad islands floating on the yellow waters. Here and there we call at a native village or an isolated landing-stage to collect *biscuits* of rubber, or nuts, but often we go for a day or more without observing any sign of life along the banks. Early each morning, as the rising sun dispels the mists, the forests along the banks of the broad river are revealed in all their beauty. The day grows hotter and hotter. Soon the thunder-clouds gather and torrential rains lash the waters into fury. They cease. The air is somewhat cooler. Then almost without warning the sun sets, the tropic night swiftly falls and darkness blots out the landscape. But gradually as the moon rises a veritable transformation takes place, and river and forest are bathed in silvery sheen.

So we reach *Manaos*, a few miles up the Rio Negro, which though 1,000 miles from the sea is a port for ocean liners. Little more than a quarter of a century ago, this city was built in the heart of the forests to serve as a rubber-collecting centre. At that time Brazil led the world in her output of rubber, but owing to lack of modern methods and to difficulties of labour and transport, the industry declined. At the present time little rubber is obtained from the Amazon basin, its original home, and most of the world's supply comes from the plantations of British Malaya and the Dutch East Indies. Thus the high hopes raised when Manaus was built have been disappointed and it is now known chiefly as a centre for tourists.

Steaming down stream from Manaus we at last reach the Narrows, where hundreds of forest-clad islands crowd so closely that the river is often less than 200 yards wide—a contrast to the average width of 2 miles. Some time later *Para* (or Belem) is reached. A picturesque town, whose white-walled, red-roofed houses are surrounded by groves of bananas and graceful palms, it is the chief port of the Amazon and the sixth largest town in Brazil. Among its exports are cacao, tapioca, nuts, timber, and some rubber.

The Brazilian Highlands

The Brazilian Highlands cover about one-quarter of the country. Towards their landward side they descend to the lowlands of the Amazon, the Madeira, the Paraguay, and the Parana. On the east they are margined by ranges, such as the Serra do Mar, which drop to the Atlantic Coastlands by steep escarpments, over which the rivers form falls in their descent. The São Francisco, the chief river between the Amazon and Plate estuaries, is navigable for 900 miles in the plateau course above its Falls, from which point a railway runs to the port of Bahia.

Thanks to its elevation, which varies from 1,000 to 4,000 feet, the plateau is the healthiest part of Brazil. Rain falls mainly in the hot season, from October to March, and there is little during the succeeding cooler months. The valleys, and some of the rainier areas near the coast, are forested. In the pine forests in the south-east of the plateau, covering an area equal to that of France, lumbering is carried on. Immense quantities of timber are shipped down the Uruguay river to Uruguay and Argentina.

But apart from these forested areas the plateau consists mainly of savannas—the *campos*—clad with grass and dotted with clumps of trees and thorn bushes. On the better-watered parts of the campos *ranching* is carried on. The chief centre on the Matto Grosso Plateau is *Cuyaba*,

on the upper Paraguay, where owing to the long dry period the farms are very large and there is less than one animal per acre. In the states of *Rio Grande do Sul*, in the south-east, and *Minas Geraes*, in the north-east of the plateau, which owing to their situation nearer the ocean receive more rain, enormous numbers of cattle and horses are reared, as well as millions of pigs which root in the open woods. Though ranching methods are not so up-to-date as those

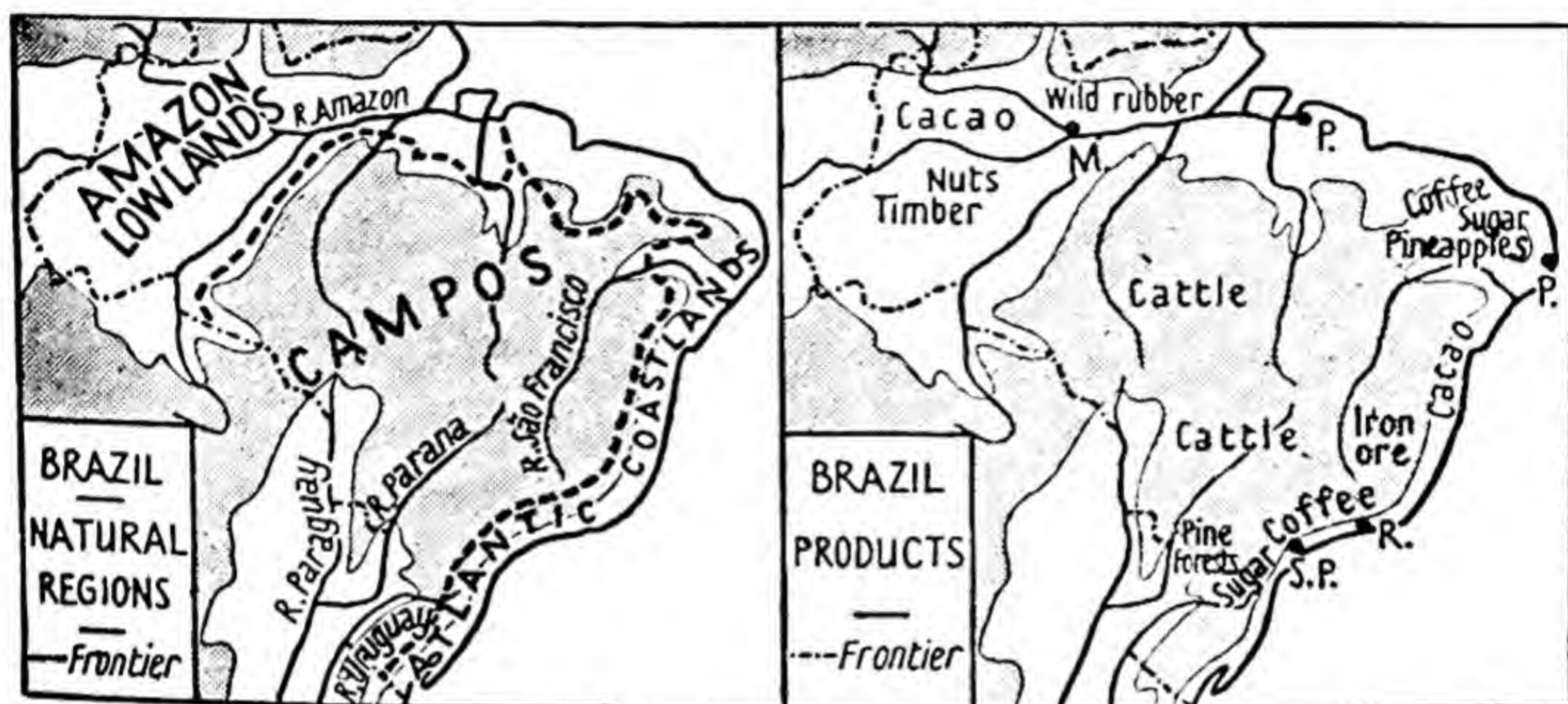


FIG. 20. Brazil.

adopted in Argentina and Uruguay, stock-rearing is an industry of growing importance. Many cattle are sent to meat-packing establishments at São Paulo, and to the port of Rio Grande, whence they are dispatched as chilled or frozen meat to Europe.

Mining is carried on in many parts of the plateau. Though at one time Brazil was noted for gold and diamonds, her chief mineral wealth now lies in her rich but as yet little-developed deposits of iron ore. The principal mining regions are situated in the state of *Minas Geraes*. The name of this state, which means 'Mines of all Kinds', is most appropriate, for its output includes manganese, gold, and diamonds, as well as iron. Some coal is mined in the state of Rio Grande do Sul.

Apart from the ranching and mining areas and the high-

lands rising above the Atlantic Plain, the plateau, though the healthiest part of Brazil, is backward in development and thinly peopled. This is partly due to the long dry season, partly to the great size of the table-land, and partly to the difficulty of access from the coast. The steep escarpment makes it expensive to build roads and railways unless they lead to rich areas, like Minas Geraes. Nothing plays a greater part in the development of a 'new' country than the building of railways, and with the extension of the railway system the plateau should become increasingly important in the future of Brazil.

The Atlantic Coast-lands and their Margins

The hot wet Atlantic Coast-lands and the slopes of the escarpment rising above them are the most productive and thickly populated part of Brazil. Out of every ten people in the country, nine live on the Coast-lands, or on the slopes facing the South-East Trades blowing in from the Atlantic. Many different kinds of crops are grown in this region, but coffee is the chief; and Brazil produces more coffee than all other countries combined (Fig. 21). The chief plantations, or *fazendas* as they are called, are found on the hill-sides stretching from the district behind Rio de Janeiro to the State of São Paulo, the chief centre of the industry.

A Visit to a Fazenda. Leaving Santos, the chief coffee-exporting port of Brazil, we travel by rail into the uplands, and after a journey of 334 miles find ourselves at *São Paulo* which, with over a million inhabitants, is the second largest town in Brazil. It owes its prosperity to the coffee industry, lying as it does in the heart of the largest coffee-growing area in the world. All around, at elevations varying from 2,500 to 5,000 feet, the hill-sides are planted with thousands of acres of coffee bushes.

Owing to their elevation the summers in these uplands are cooler than those of the lowlands at their base. The average temperature is seldom greater than that of a hot

summer's day in England (70° F.); but the winters are mild, and though slight frosts occur in the early morning, the hard frosts, fatal to coffee trees, are practically unknown. The slopes receive plenty of sunshine and ample rain (about 55 inches a year) from the South-East Trades. The rainstorms occur mainly during the summer months, from November to February, thus providing plenty of moisture during the growing season, while the slope of the



FIG. 21. World Production of Coffee.

land allows the surplus water to drain away. But above all it is the deep-red soil, formed of weathered volcanic rocks mixed with humus derived from bygone forest trees, that makes this region so suitable for coffee cultivation.)

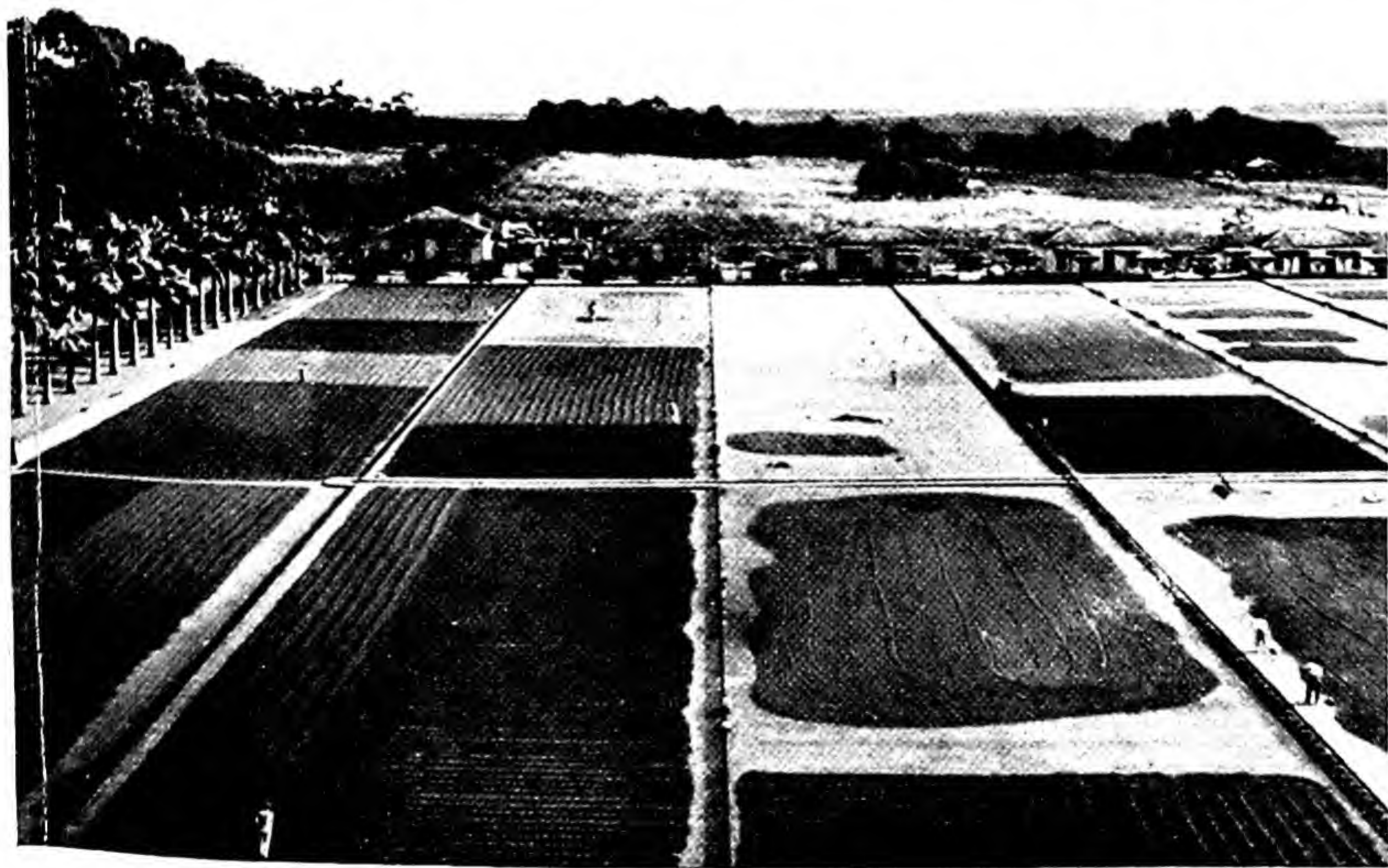
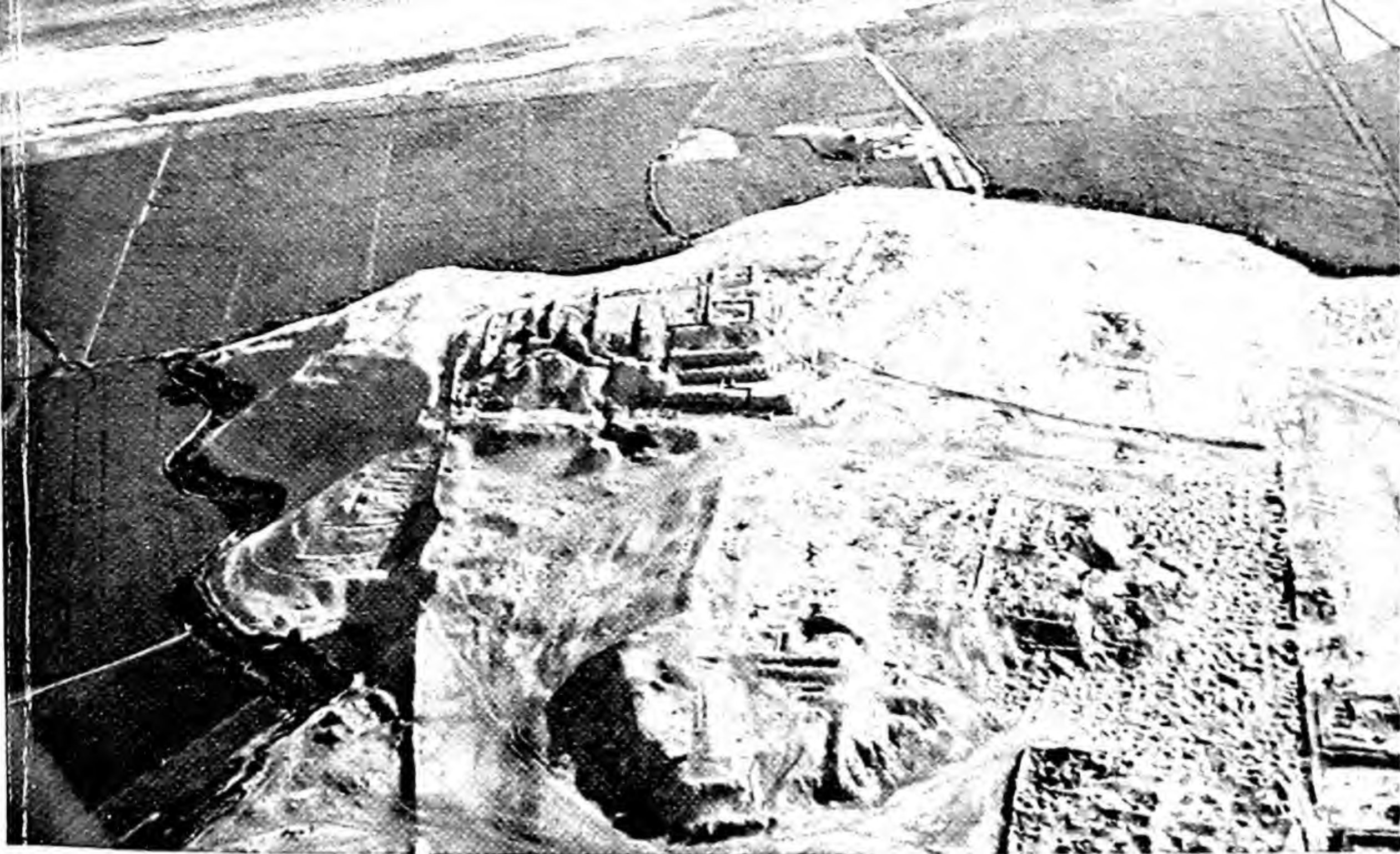
On many *fazendas* there are from 300,000 to 400,000 trees, and on some the number reaches 800,000. In the foreground is the planter's house, generally a rambling two-storied white building. Nearby are rows of huts for the labourers and their families, stables for the horses, sheds for the lorries, big concrete washing-tanks, and drying-grounds. As it is estimated that one labourer is required for every 2,000 coffee bushes, the number working on a plantation is considerable. In addition there are storemen, carters, lorry-drivers, and drying-ground labourers.

(The coffee seedlings, which are planted out during the rainy season, require much attention during the early stages of their growth.) On some *fazendas* they are reared under a



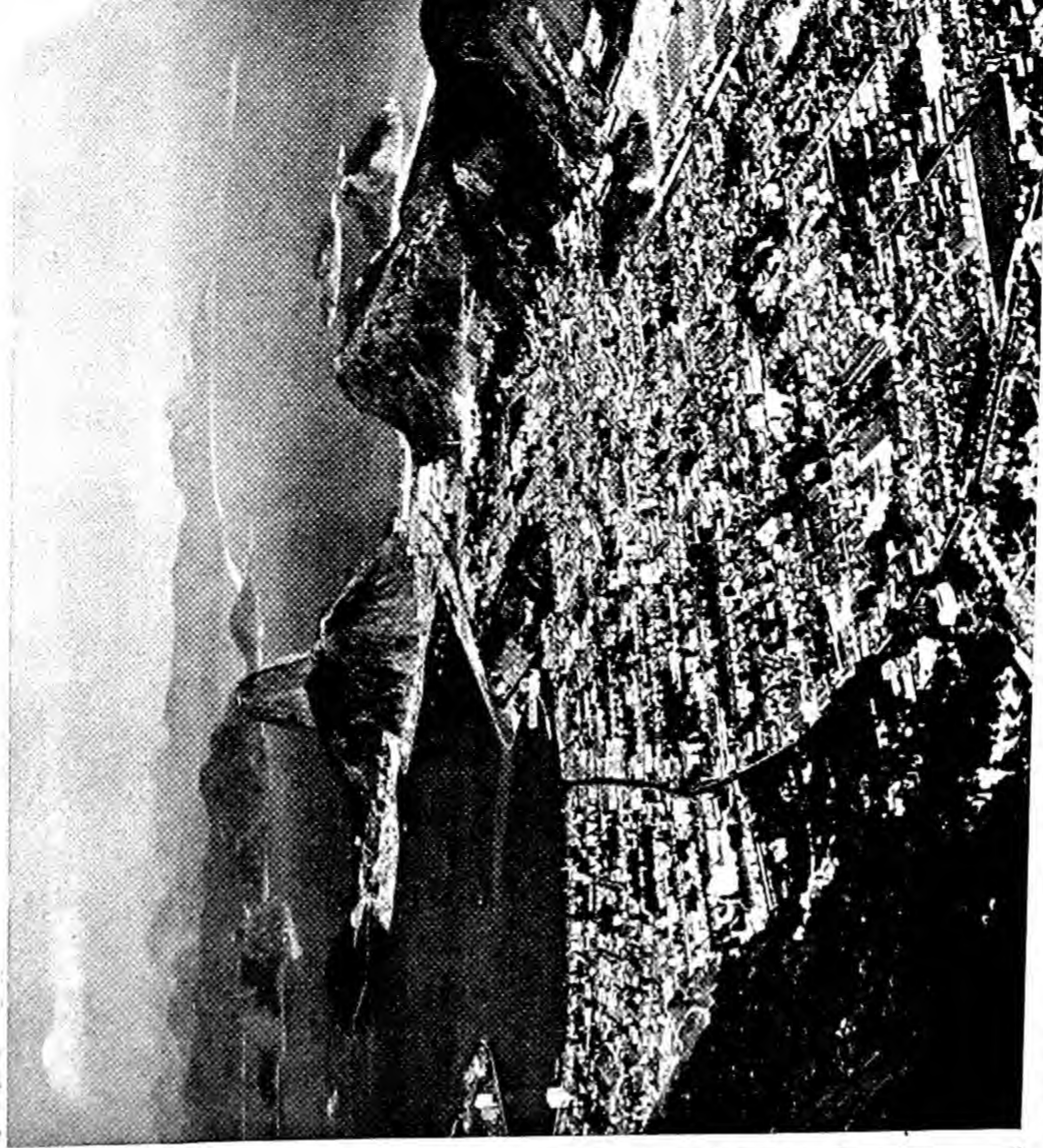
FIG. 22. South-eastern Brazil.

(trellis-work supported by high poles; on others shade-trees (usually a kind of coarse bean which enriches the ground when it dies down) are planted for shelter. Later the young bushes are set out in rows about 8 feet apart. The first crop of berries is produced in the fourth year; the bushes reach



1. YESTERDAY AND TO-DAY IN PERU—COFFEE IN BRAZIL

(Above) The ruins of an Inca Temple in Peru. It stands on a commanding site overlooking the coast-lands, whose prosperity to-day, as in Inca times, depends on irrigation (see pp. 5 and 78). (Below) A coffee-drying ground on a fazenda, São Paulo State, Brazil. The coffee beans have been brought by cart from the plantation: now with their big brooms, the men are spreading them over the concrete 'flats' to dry (see p. 45)



2. CONTRASTS IN CAPITALS

(Left) A Sunday street market in La Paz, one of the two capitals of Bolivia (see p. 75). The wares are laid out on the cobble stones. The ponchos of the Indians contrast with the 'Sunday best' clothes of the men seen in the right foreground. The houses are built in Spanish style. (Right) Rio de Janeiro, one of the finest cities in South America, stands on a magnificent harbour. The Sugar Loaf (1,200 feet), its outstanding landmark, can be seen in the middle background. Compare its rectangular layout with that of La Paz (see p. 47)

their full bearing in their sixth year and continue to yield for some thirty-five years.

(In the wild state coffee trees attain a height of about 20 feet, but cultivated varieties are usually pruned so that they do not exceed 10 or 12 feet. Most of the berries contain two beans, though occasionally there is only one larger one which is known as a pea berry. As the berries ripen their colour changes from green to gold, and then deepens to a dark crimson shade.)

Bands of skilled workers travel from one *fazenda* to another pruning the trees. From May to September, lightly clad, bare-footed men, women, and children—often of Italian descent—gather the harvest. On many *fazendas* long cloths are spread between the rows, and as they walk along the pickers run their hands down the branches, sweeping berries and leaves on to the sheets. On other plantations the berries are picked and thrown into baskets slung over the shoulders, ladders being used to reach those on the higher branches.

Machines crush the berries and strip off the outer pulpy covering of the beans, which are washed in long concrete tanks fed by running water. The beans, still encased in two skins, are now spread out on concrete or brick-paved drying-grounds where they remain in the blazing sunshine from five to ten days (Plate 1). Sometimes they are dried by machinery, the process then taking twenty-four hours.

The dried beans pass through a *hulling* machine which, by removing the outer casings, leaves them ready to be passed through sieves which grade them according to size. They are then packed in bags and sent by lorry or ox-cart to the light railway which carries them to São Paulo, whence they are dispatched to Santos, a port handling well over half Brazil's coffee crop.

Between August and January the streets of *Santos* are alive with lorries, ox-, mule-, and donkey-drawn carts piled high with bags of coffee. At the warehouses the beans are

again sorted and packed in bags, each holding 132 pounds. The bags are loaded on to the ships by belt conveyors, which shoot from eight to ten thousand of them into the holds in an hour. With its 3 miles of quays, its modern warehouses, its elevators, conveyors, electric cranes, and excellent railway service, Santos is well equipped for its immense trade in coffee—Brazil's most important export.

(More than half the Brazilian coffee is dispatched to the United States, about one-tenth to France and Germany, but little to England. The coffee beans we buy in grocers' shops have been roasted, a process which turns them brown and brings out their flavour.

Life and Work in the Lowlands. In May we should see workers busy gathering oranges round Santos and Rio de Janeiro. Much of the fruit is exported from these ports to the British Isles, where it arrives just as the supplies from Spain, Palestine, and California are beginning to fail. The hot wet climate of the coastal plain favours the production of tropical crops like cacao, tobacco, sugar-cane, and cotton. On the more sheltered parts of the lowlands, stretching from Victoria northward to the mouth of the São Francisco, are many *cacao* plantations. Much *tobacco* is grown in the lower São Francisco valley and both cacao and tobacco are exported from *Bahia*, whence the railway climbs the steep escarpment to the Highlands.) As in many other ports along the coast, the trading quarters are in the lower town, near the docks, whence cars and electric lifts carry people to the upper town, a cooler and healthier district where the wealthier folk reside.

(Farther north, on the sandy plains around Pernambuco, we should see negroes working in the *sugar-cane* plantations and the *cotton* fields.) We should also find them gathering pineapples, which like rubber and cacao are indigenous to Brazil, and grow wild near the coast. *Pernambuco* was formerly called Recife, 'the reef', on account of the coral

reef which almost encloses its splendid harbour. The chief sugar-exporting port of Brazil, it is three days distant by steamer from Rio de Janeiro.

Rio de Janeiro, the capital, with a population of one and three-quarter millions, is the second largest city in the Southern Hemisphere. It stands on one of the finest harbours in the world, on one side of which rises the famous Sugar Loaf, a hill so called from its resemblance to the loaves of sugar in which shape cane-sugar was formerly






EXPORTS OF BRAZIL	
Coffee	
Cotton	
Cacao	
Hides & Skins	
Rest	

FIG. 23.

exported. The port handles more than two-thirds of the foreign trade of Brazil. Among the exports from its hinterland are coffee and frozen meat and hides from the *campos*. It imports wheat and maize from Argentina, as well as machinery, iron and steel goods, and textiles which come mainly from the United Kingdom and the United States. These products remind us that Brazil is an agricultural rather than a manufacturing country. But manufacture is increasing, for though Brazil is poor in coal she has rich water-power resources, and many mountain streams descending from the Highlands to the south-east plains are harnessed to generate electricity, which is used in the cotton, boot and shoe, tobacco, and match factories of a number of coastal towns. As in the case of Santos and other of the more important ports, railways from Rio de Janeiro run inland up the steep escarpment to the plateau. There is, however, in this land of huge distances, no railway right along the coast. This seems strange until we remember that, with the exception of São Paulo, all the largest

towns are ports, and communication between them is carried on by water, a much cheaper form of transport than rail. There are regular air services from Rio de Janeiro to the principal cities of South America as well as to Europe and North America.

EXERCISES

1. Give an account of a journey up the Amazon from Para to Iquitos (Peru). Illustrate your answer by a sketch-map.
2. (a) Name four things that have contributed towards making the São Paulo district the chief coffee-producing area in the world. (b) Name the principal port of export for this area. At what time of the year is it busiest? (c) Name one other port which exports coffee.
3. There are *flour-mills* at Rio de Janeiro; *meat-packing establishments* at Rio Grande, and *sugar-refineries* at Pernambuco. Account for their presence in the towns named.

CHAPTER V

ARGENTINA, PARAGUAY, AND URUGUAY

An Agricultural Country

LONG before the traveller on a vessel bound for Buenos Aires enters the broad shallow estuary of the Plate he notices that the waters of the Atlantic are stained a golden brown; for so great is the load of sediment poured by the rivers Uruguay and Parana into the estuary that silt is carried far out to sea.

Gradually the flat line of the Argentine coast takes shape, and the pampas, stretching right to the water's edge, can at last be distinguished—level brown and green plains, spreading westward to the foot-hills of the Andes, northward to the forests of the Gran Chaco, and southward into Patagonia. From the pampas is obtained most of the wealth of Argentina, the richest country in South America.

Argentina, with an area of somewhat more than 1,000,000 square miles, is about a third the size of Brazil, and has approximately one-quarter that country's population, but it contains a greater proportion of productive land. Though Argentina stretches to within a few hundred miles of the Antarctic Circle, most of the country lies within the Temperate Zone, and this, coupled with the fact that the majority of the people are of European descent, has tended to make the inhabitants more energetic than those of Brazil. Argentina is almost wholly an agricultural land. There is little coal or mineral wealth, and the supplies of petroleum obtained from the Chubut Oil-field of Patagonia are relatively small. Some of the snow-fed streams, descending from the Andes, are harnessed to generate electricity, but the distance of this region from the eastern seaboard, the most thickly peopled part of the country, is so great a handicap that little use can be made of it.

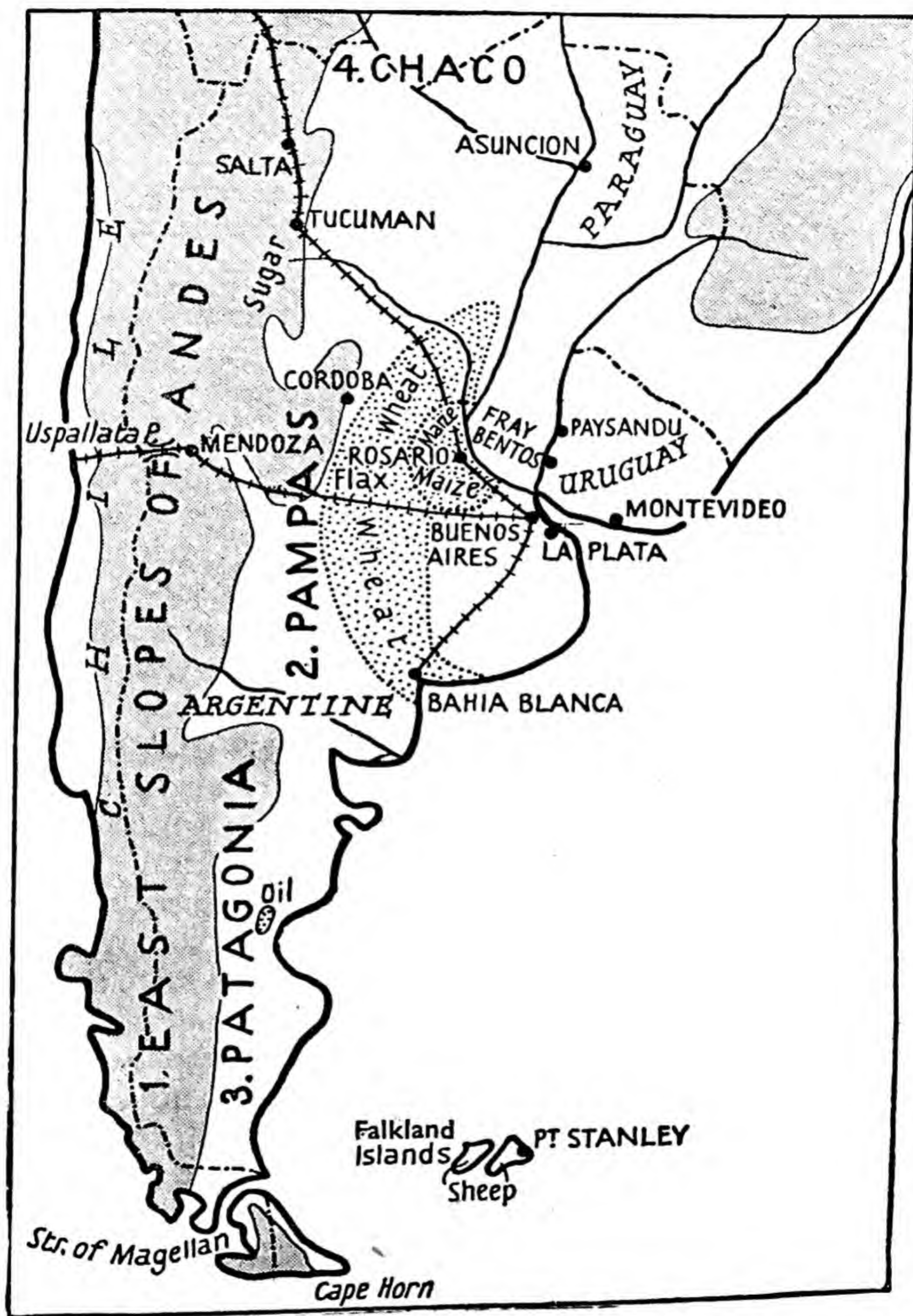


FIG. 24. The Argentine, Paraguay, and Uruguay.

We may divide Argentina into four main regions: (1) the *Eastern Slopes of the Andes*; (2) the *Pampas*; (3) *Patagonia*; and (4) the *Gran Chaco*.

The Eastern Slopes of the Andes

Stretching along the lower eastern slopes of the Andes, and having an average width of 100 miles, is an arid belt which covers about one-quarter of Argentina. On the north-east this region sinks to the Gran Chaco: on the south-east to the pampas. Vast stretches consist of bare rocky wastes, with cactus and scrub on the lower slopes. But, in great contrast to these arid areas, the valleys and plains of the foot-hills, watered by snow-fed streams, form verdant and populous oases. The province of Tucuman, one of these fertile regions, is the principal *sugar-growing* district in Argentina. The ground is extensively irrigated and carefully cultivated. Many thousands of the regular population are employed in the industry, but at harvest time, when additional labour is required, Indians come from remote mountain villages and from the Gran Chaco to help with the work. The canes, now from 10 to 20 feet high, form with their tough stems and their long sharp leaves a dense mass of vegetation. Into this tangled jungle go the labourers, each carrying a curved knife about 2 feet long. First the leaves are slashed off, and when this *trash*, as it is called, has been cleared away, the canes are felled, cut into suitable lengths, and at once taken to the refineries, where the machinery is electrically driven by power obtained from the mountain streams. There is a charm about *Tucuman*, cupped in a valley amidst the hills. The provincial capital and the most populous town in the north-west of Argentina, its wide sunny streets are arched with shady trees, while all around are plantations of canes, broken here and there by the darker green of orange groves and orchards. And away to westward rise the Andes.

To the south, *Mendoza* lies in another irrigated valley

rich with vineyards, through which innumerable channels run like silver threads across the thirsty land. This town stands in the chief vine-growing and wine-producing district in Argentina (Plate 3). *San Juan*, about 100 miles to the north, is famous for temperate fruits, such as peaches, apricots, and plums. Eastward of Mendoza, the land sinks through a wilderness of cactus and scrub to the pampas plains. Behind, the road and the Transandine railway run through the foot-hills and then zigzag up steeper slopes towards the Uspallata Pass. The road winds through the pass: the railway runs underneath it, through a tunnel 2 miles long and 2 miles above sea-level. At the summit of the pass, on the boundary between Chile and Argentina, stands the bronze statue of 'The Christ of the Andes', erected to commemorate the signing, in 1902, of a treaty of perpetual peace between the two nations whose frontiers here meet. In the distance, Aconcagua, the highest peak in the American continents, towers above lofty ranges, clad with those eternal snows which feed streams upon whose life-giving waters towns like Tucuman, San Juan, and Mendoza depend for their prosperity.

Patagonia and its Sheep Farms

Nearly one-third of Argentina consists of the bleak wind-swept Plateau of Patagonia, which stretches from the Rio Negro southward to the Strait of Magellan, and from the Andes eastward to the Atlantic. As this region lies on the leeward side of the Andes it receives little rain, for the prevailing Brave West Winds deposit most of their moisture on the westward slopes of the mountains. There are considerable areas of stony and sandy desert, but much of Patagonia is covered with rough herbage and low shrubs, intersected by stretches of bog, and crossed by rivers whose sources lie near the snow-line of the Andes which descends to within 3,300 feet of sea-level. Owing to the violent winds and cold summers this region is unsuited to agriculture.

Even towards the end of the last century, the only inhabitants of Patagonia were roving Indian tribes who lived by fishing, and hunting rheas (small ostriches), foxes, guanacos, relatives of the llama; and wild cattle, descendants of domesticated animals brought by the Spaniards to the Pampas. But some forty years ago, sturdy shepherds of Scottish descent, coming from the Falkland Islands, made their way to this uninviting land and started sheep-farming. So successful were they that a considerable proportion of Argentina's forty-five million sheep are now found in Patagonia.

Most of the farms lie beside rivers, like the Rio Negro and the Chubut, or amidst the Andean foot-hills. In such areas, isolated farm-houses, built for shelter under the lee of a hill or cliff, with their shearing-sheds, corrals, and sheep-dips, lie amidst huge paddocks enclosed by wire fences. Owing to the scanty rainfall and the bleak and biting winds, the herbage is poor, and six acres of land are needed to support one sheep. Occasionally a flock may be seen nibbling the coarse tussock grass, but often it is possible to travel for hours without seeing any sign of human or animal life.

Life on a sheep station is hard work. In September the young lambs are born, and as soon as they are ready to leave their mothers are branded with their owner's mark. Then when the warm December days come round the sheep are clipped. The long shearing-sheds echo and re-echo with the bleating of sheep and the whirr of the machine clippers, by the aid of which a skilled man can deal with some fifty sheep in a day. On some farms the fleeces are sorted, graded, and packed into bales for export. More often, however, they are dispatched to the wool market at Buenos Aires, where they are sorted and sold for export to Yorkshire or some other woollen manufacturing area in Europe. Many sheep are sent to the *frigorificos* where they are killed and turned into chilled or frozen mutton, much

of which is also exported to England. In April and May, when the days are already growing shorter and the chilly winds of autumn announce the approach of winter, the sheep are dipped, for now they have grown the thick coats they will need when cold blizzards from the South Polar regions sweep over the runs, and driving snow covers the ground.

In the north-east of Patagonia is the *Chubut Petroleum Field*, discovered about thirty years ago, whence oil is conveyed by *tankers* to refineries at La Plata.

The Pampas

The Pampas, which cover about one-fifth of Argentina, are by far the most productive region in the country. Once probably a shallow arm of the sea, their surface, built up of alluvial and wind-borne soil, is almost devoid of rocks and stones. Boundless and flat, the dead level of these natural grasslands is broken only by the rows of poplars and clumps of eucalyptus trees planted around a homestead, by the houses of an occasional town, and by the tall towers of innumerable steel wind-pumps which stretch like giant skeletons to the horizon. As few rivers cross the pampas, it is these windmills that supply the power necessary for raising the water for men, stock, irrigation, and railway engines.

Argentina ranks second only to Canada in her export of wheat. The chief grain-growing regions are in the east, which receives more rain than districts nearer the Andes. Wheat and maize are by far the most important cereals, but oats and barley, as well as flax (for linseed), are also grown. From Bahia Blanca the wheat belt stretches for some 700 miles northward, spreading out like a great crescent bulging towards the west. The maize belt, which forms a smaller crescent within this area, has its centre at Rosario, at the head of ocean navigation on the Parana (Plate 4).

The chief enemies of the farmer are drought, hailstorms,

locusts, and uncertain world prices, all of which are difficult to guard against. In times of drought crops and stock die; hailstorms flatten the grain, making it impossible to harvest it; and clouds of locusts coming from the north descend upon the land, devour all plant life and leave the countryside bare, brown, and desolate.

Cattle are widely grazed throughout the pampas, but the chief stock-rearing area is in the south-east of the province of Buenos Aires, where enormous numbers of beef and dairy cattle are found. Much of the land is sown with alfalfa grass, whose long roots, which enable it to draw water from a considerable depth, make it more luxuriant than ordinary grass, so causing animals fed on it to reach prime condition sooner than would otherwise be the case. Though maize, wheat, and fodder crops are grown, the western portion of the pampas is primarily a stock-rearing area. Immense herds of cattle are raised, but in the still drier lands towards the Andes they tend to be replaced by sheep.

An *estancia*, as the huge estates are called, of 50,000 acres will probably carry 20,000 cattle, with a thousand or more beasts roaming in each paddock, usually 1,000 acres or so in extent. The management of such an estancia requires much organization. Apart from caring for the stock and crops, there is a vast amount of detail to attend to; for the wire fences, miles in length, the blacksmith's and harness-shops, the store, the electric light plant, and the dairy need constant attention. The owner probably resides in a luxurious house set amidst well-planned grounds. His *peons*, still called gauchos, dwell with their families in simple adobe (mud) huts. The gaucho's mode of living is very different from that of his rollicking, hard-riding forebears who hunted far and near over the plains. But he is still a picturesque figure in his broad sombrero, his high-heeled spurred boots, and his gaily coloured poncho which almost conceals a loose shirt tucked into baggy trousers. He is

famed for his horsemanship, but apart from rounding up the stock and breaking in bucking colts, he spends most of his time riding round the estancia repairing the wire fences, dipping the cattle, seeing they are properly watered, looking for dead or sick animals, and greasing the wind-pumps. From time to time the gauchos drive the fattened cattle along the wide wire-fenced tracks to the railway stations where, kicking, bellowing, and grunting, they are hustled up the gangways into railway trucks.

Cattle and sheep are taken to Buenos Aires, Rosario, or La Plata where they pass through the *frigorificos*, and emerge as frozen or chilled beef or mutton. The erection of these *frigorificos*, or freezing-works, and the introduction of cold-storage plants on steamers, made a tremendous difference to the Argentine ranchers. Before these inventions jerky (salt beef) and dried beef were in general use, while such animals as were exported to Europe often arrived in poor condition after their long sea voyage. The demand for frozen meat brought prosperity to the farmers. They were able to import pedigree animals to improve their herds, erect wire fences to enclose their paddocks and wind-pumps for raising water, and purchase up-to-date agricultural machinery.

These improvements marched hand in hand with the development of the railways, many of which were built with British money and by British engineers. The level nature of the pampas made railway construction a relatively easy matter, and as the lines were pushed westward so did the farming community move westward too. At the present time railways are used both for long and short distance transport, for, owing to the absence of stones for road-making, the roads on the pampas are poor. Indeed they are often mere tracks, sometimes deep in dust, sometimes a sea of liquid mud.

To-day we can travel in well-equipped trains over the pampas, where once the gaucho rode, and pack-horses and

high-wheeled covered ox-wagons loaded with salt, hides, and jerky were driven across the plain. Most of Argentina's 24,700 miles of railway serve the agricultural areas of the pampas, over which lines radiate from Buenos Aires—the focus of the system—Rosario, La Plata, and Bahia Blanca. It is possible to journey from Buenos Aires to Valparaiso, by the Transandine Railway, in just under forty hours; and to La Paz, in Bolivia, in about three days.

Buenos Aires, with a population of two and a quarter millions, is the largest city in the Southern Hemisphere, the chief port of South America, and one of the leading ports in the world. Its broad streets and spacious squares, skyscrapers, palatial houses, underground railway—the only one in the Southern Hemisphere—and its 6 miles of docks and wharves, all bear witness to its prosperity. Its waterfront is lined with warehouses, above which rise grain elevators, flour-mills and *frigorificos*. Buenos Aires handles the bulk of Argentina's overseas trade, exporting grain, meat, wool, and hides; and importing textile goods, fuel oils, coal, chemicals, iron and steel goods, locomotives, and machinery.

At *Rosario*, a town of half a million, ranking second in size to the capital, the yield of Argentina's grain-lands is pumped into the holds of ships which, loaded with wheat and maize, linseed, and frozen meat, steam down the Parana to the Plate estuary and the Atlantic. *La Plata*, somewhat south of Buenos Aires, packs meat, refines oil, manufactures wind-pumps, and, of course, exports grain and meat. *Bahia Blanca* has a similar export trade; but it also ships wool from the pampas and the sheep-farms of Patagonia for which it is the chief outlet.

The Gran Chaco

'Interest lies in contrast', says an old Spanish proverb, and great is the contrast between Patagonia, in the south, and the Gran Chaco, in the north of Argentina. The former

is a bleak windswept plateau: the latter consists of little-known sub-tropical forests. The Gran Chaco, which covers over 250,000 square miles, stretches from the Paraguay valley towards the Andes. Part of it lies in Paraguay and Bolivia, but it comprises about a fifth of Argentina. Though much of this region consists of forests and dank swamps, there are also wooded grasslands and open glades where some cotton, oranges, and yerba maté, or Paraguayan tea, are grown. In the remote recesses live Indian tribes who dwell in communal huts, called *ranchos*. These primi-







FOREIGN TRADE OF THE ARGENTINE			
EXPORTS		IMPORTS	
Grain & Flour		Textiles	
Wool, Skins & Hides		Fuel Oils	
Meat & Cattle		Iron & Iron Goods	

FIG. 25.

tive folk, wearing only a small apron, 'sometimes decorate their bodies with brilliant dyes and tattooed designs of beasts and reptiles. Their weapons are bows, arrows, and poisoned spears, stuck handily in the waist-belt supporting the kilt-like apron.'¹ In the forests the most valuable tree is the gnarled and twisted *quebracho*, whose name, meaning the *axe-breaker*, has been given to it because of the great hardness of its wood, so heavy that it will not float. The trees grow in single stands, scattered throughout the forests. When the lumbermen find a tree, they fell it, lop off its branches, strip off the bark, and place the blood-red trunk on an ox-cart on which it is hauled to the nearest *playa* (depot), whence it is sent to the factory. The tree is greatly prized because it yields *tannin*, a substance used in tanning leather (Plate 3).

Corrientes, at the confluence of the Parana and the Paraguay, lies between the Gran Chaco and *Entre Rios* ('between the rivers'), the district stretching from the Uruguay to the Parana. This quaint old town is situated in the centre of a

¹ C. W. Domville Fife, *Modern South America*.

stock-rearing area. On the wooded pastures bordering the Gran Chaco are fed native cattle, descendants of those introduced from Europe by early colonists. The animals are grazed mainly for their hides and partly for their meat, which is salted for *jerky*. But on the richer meadowlands to the south of Corrientes, herds of improved breeds of cattle are reared.

PARAGUAY

A steamer travelling up the Parana and Paraguay takes three days to cover the 950 miles from Buenos Aires to Asuncion, the capital of the Republic of Paraguay. If, however, the journey be made by rail, the time is reduced by a day. *Asuncion* stands near the confluence of the Paraguay and the Pilcomayo. Though the city has many modern buildings, most of the dwelling-houses are single-storied structures, built in Spanish style around shady courtyards where fountains play and gorgeous flowers bloom. The ninety-five thousand inhabitants of the city represent one-ninth of the total population of the country, whose area is slightly greater than that of England and Wales. Paraguay shares with Bolivia, her neighbour on the north-west, the disadvantage of having no seaboard. Thus much of the external trade is carried on by means of river steamers.

The climate, though too humid and hot for wheat, is excellent for maize, while other warmth-loving crops, like sugar-cane, oranges, cotton, tobacco, and bananas, are grown, and some rice is cultivated on low-lying lands near the rivers. Much of eastern Paraguay consists of grasslands, well suited for cattle, though temperatures are rather too high for sheep. The forests of the Gran Chaco, in western Paraguay, like the adjacent areas in Argentina, yield quebracho and yerba maté. From the leaves of the latter tree, which belongs to the holly family, a drink resembling tea is made. It is so commonly drunk in Paraguay, Brazil, and Argentina that it may be regarded as the national

beverage of these countries. Maté tea is not poured out of a teapot: a gourd, or perhaps a silver flask, is used, and the liquid is sucked through a little tube inserted in the top of the vessel. The trees grow wild, but there are many plantations on which they are cultivated. The picking-season starts about April, at the beginning of the mild winter, and after the leaves have been gathered they are dried and scorched over a fire. They are then laid upon the ground, where they are beaten to powder with flails. This powder is then packed in sacks and sent to factories where it is ground and bleached. Yerba maté, cattle, and timber (including quebracho) are the chief cash crops of the pleasant though undeveloped republic of Paraguay.

URUGUAY

Uruguay, the smallest South American republic, extends from the Atlantic to the river Uruguay, which, with the Plate estuary, separates it from Argentina. The country possesses some 700 miles of navigable waterways and 1,700 miles of railways. Both are extensively used for transport, but in areas remote from either river or road goods are carried mainly in ox-waggons.

Uruguay consists almost entirely of grasslands which form an eastern extension of the pampas, though unlike the latter they are gently undulating rather than flat. In both climate and natural vegetation the country resembles the province of Buenos Aires. The summer months, from December to March, are warm but not too hot: the winter months, from June to September, are cool and bracing. In no other land are the people so dependent on pastoral industries, and the whole of the republic may almost be regarded as one huge and well-watered ranch upon which some seven million cattle and twenty million sheep are pastured. Meat and meat extracts, together with wool and hides, form the chief exports. *Fray Bentos*, on the Uruguay, is the chief meat-canning centre; while *Paysandu*, somewhat

higher up the broad river, has an enormous *frigorifico* as well as meat-packing establishments. *Montevideo*, the capital and only really large city, stands on a bay dominated by the hill from which it derived its name. On the east side of the bay, the houses rise in terraces from the shore, where a channel has been dredged to allow vessels to enter the port. Ships from many lands cast anchor here and in winter British and Scandinavian whaling-ships, fishing in Antarctic waters, use the harbour for anchorage.

A large proportion of the two million inhabitants of Uruguay are of Spanish or Italian descent, but numbers of folk of British stock have also made their homes on the *estancias* of this temperate land.

EXERCISES

1. Draw a sketch-map of Argentina and on it print boldly the names of the four chief regions. State which region you consider the most important and give *three* reasons for your answer.

2. Describe the work of a farmer in Patagonia during the different seasons.

3. With the aid of your atlas, describe a trip up the Parana and Paraguay rivers from Buenos Aires to Asuncion.

4. Name *one* area in Argentina where crops are grown chiefly on irrigated lands. Name *one* important crop and say what you know about its cultivation.

5. Why do you think the following industries are carried on at the towns named: (i) flour-milling at Buenos Aires; (ii) the manufacture of wind-pumps at La Plata; (iii) meat-packing at Paysandu?

6. Account for the following facts: (i) There are few good roads on the pampas; (ii) there are many tanneries in Paraguay; (iii) Uruguay imports timber from Brazil.

CHAPTER VI

THE FALKLAND ISLANDS

THE Falklands, a group of two large and a number of smaller islands, have a total area equal to two-thirds that of Wales. Situated 300 miles east of the Strait of Magellan, they form an outpost of the British Empire set amidst the stormy waters of the South Atlantic Ocean. Lying right in the track of the Brave West Winds, their climate is so bleak that it is impossible for trees to grow, though hardy crops, such as oats and potatoes, are cultivated for local use. But their hilly moorlands, which resemble those of Scotland, provide excellent pasture for sheep-farming, the principal occupation. The hard-working and thrifty people are mainly of Scottish descent. Half of the inhabitants live in *Port Stanley*, the capital, which has 1,200 inhabitants. To its repair yards come vessels battered by the driving gales and terrible seas experienced in the passage round Cape Horn. The monthly mail boats bring groceries, coal, clothes, and machinery, and take away bales of wool, the chief export after whale oil. In the harbour we might see sealing-ships, and also whaling-vessels setting out for Antarctic waters where South Georgia—a dependency of the Falkland Islands—is the chief centre of the whaling industry. Other dependencies of the Falklands are the South Shetlands, the South Orkneys, and Graham's Land in Antarctica.

A modern steel whaling-ship is a veritable floating factory. It is equipped with apparatus for *flensing* the animals and extracting oil, fertilizers, and whalebone from the carcasses. The actual harpooning is carried out from small ships called 'catchers', whose base is the mother vessel.

'There she blows', cries the look-out man, when from his point of vantage in the *crow's nest* he spies a black fin

and what looks like a spout of water rising from the sea. 'There she blows', he repeats: the 'catcher' is swung into position, and the harpoon, with its charge of powder, is fired from a powerful gun in the bow. The great dart, with cable attached, enters the monster, and death follows immediately. Now the carcass is inflated and towed to the factory ship, and hauled on to the floating platform alongside for cleaning and cutting. The crew turn to with sharp knives; in a couple of hours the monster has been cut up, and its blubber fed to huge vats whence it emerges as whale oil. This oil is used in the manufacture of margarine and soap, dressing leather, the preparation of flax and jute, and for lubricating machinery.

On a few of the newer vessels the whale is drawn, tail foremost, through a forward hatch, worked by an electric windlass which carries it direct to the flensing floor on board the ship itself.

EXERCISES

1. (a) What part of Britain most closely resembles the Falkland Islands? (b) On your atlas measure the distance from Port Stanley to (i) Montevideo, the port via which mail boats travel to Port Stanley; (ii) Cape Horn; (iii) South Georgia, and (iv) Graham's Land.
2. What is the principal export of the Falkland Islands? Describe how it is obtained. Mention its chief uses.

CHAPTER VII

STATES OF THE SOUTH-WEST ANDES—CHILE,
BOLIVIA, AND PERU**Chile: the Country and the People**

CHILE stretches from the Pacific Ocean to the snow-clad crests of the Andes, whose lofty ranges form a barrier between the west coast of South America and the rest of the continent. Communication between Chile and Argentina has for generations been carried on over the Uspallata Pass, now tunnelled by the Transandine Railway.

Chile is about three times the size of Great Britain. Its seaboard extends from the frontier of Peru southward for 2,800 miles to Cape Horn, but despite its length the country has an average width of only 100 miles. The people are mainly of Spanish descent, though the majority of the peasants are *mestizos* of mixed Spanish and Indian origin, and numbers of full-blooded Indians live in Southern Chile. Many Chileans have English, Scottish, and Irish blood in their veins, for British people and British money played no small part in the development of the country.

We may divide Chile into the following regions, differing in climate, natural vegetation, and resulting occupations and industries: (1) *Southern Chile*; (2) *The Vale of Chile*; and (3) the desert land of *Northern Chile*.

Southern Chile—Fiords and Forests

In Southern Chile the on-shore Brave West Winds drench the windward slopes of the Andes with heavy rain, especially during winter when fierce gales sweep inland from the Pacific. Winding fiords extend inland between steep mountain walls, over which streams, fed by abundant rains and melting snows, plunge in cascades to the waters below.

Forests climb the slopes to the snow-line, above which shoulders of bare rock jut out between the glaciers that fill the upper portions of many of the valleys. Off-shore lie thousands of rugged forest-clad islands—peaks of a submerged mountain range. This part of Chile, the wildest and most beautiful region in the country, shows a striking resemblance to British Columbia and the fiorded coast of south-west New Zealand.

Puerto Montt is the terminus of the line from Santiago, 670 miles to the north. To the south no railway or road runs along the indented coast, and transport is carried on by water. Puerto Montt is the centre of a sheep-rearing district, as too is *Magallanes* (Punta Arenas), on the Strait of Magellan, which exports wool, mutton, and some coal from nearby mines. The only way to reach this isolated settlement, the most southerly town in the world, is by steamer, which means a voyage of 1,000 miles from Puerto Montt, the nearest Chilean port.

Outside the few towns, whose inhabitants are mainly white folk, Southern Chile is a thinly peopled region inhabited mainly by Indians. Some are lumberers; a few, like those on the island of Chiloe, grow potatoes and other hardy crops; a number work on the sheep stations; but the majority are hunters and fishers. They travel long distances in their dug-out canoes, fashioned out of the trunks of beech trees.

Among the most primitive of these Indian tribes are the Fuegians, inhabiting Tierra del Fuego and other islands which form the broken southern margin of the Strait of Magellan. Some dress in old clothes discarded by white men, but many still wear skins. They live—exist would be a better word—by collecting shellfish, hunting foxes and seals, and killing geese and other wildfowl with their bows and arrows, tipped with stone or fish-bones. Constantly on the move, some live in tepees made by sticking ends of branches in the ground and bending them over to form a

dome which they cover with skins; others dwell in crude huts built by covering a framework with bark and moss.

Like most primitive peoples the Fuegians are dying out. The European seamen who first visited them found that the islanders signalled to each other across the intervening waters by means of fires. Their piles of blazing logs, 'dotted over the dark forbidding mountain-sides and reflected by the snowfields and glaciers and in the still waters of the fiords, so deeply impressed the early explorers' that they named the chief island of the archipelago, *Tierra del Fuego* — 'The Land of Fire'.

The Vale of Chile

The Vale of Chile, lying between the Coast Range and the main chain of the Andes, is about 600 miles long and varies in width from 25 to 60 miles. It is divided into a number of smaller valleys by the low ranges of hills which link the two marginal chains.

In this central part of Chile the winters are mild and rainy, for at this season the Brave West Winds blow on-shore. On the other hand the summers are dry because at this time of the year the South-East Trade Winds blow off-shore or parallel to the coast. The northern part of the Vale of Chile, which gradually merges into the rainless region, receives less rain than the southern portion, where the rainfall increases towards Southern Chile. The climate, with its hot, dry, sunny summers and mild rainy winters, resembles that of the lands around the Mediterranean Sea. So, too, do the natural vegetation and crops.

Short swift streams, descending from the snowy slopes of the Andes, supply water for irrigation, and are used to generate electric power. In the cooler south the chief fruits are apples, pears, plums, and apricots; but in the warmer north vineyards, olive and lemon groves add beauty to the landscape. In the north of the Vale, the olive trees, scattered over many of the sunlit hill-sides, present a charming picture,

with their wide-spreading branches, gnarled trunks, and small leaves, greyish green above and silvery white beneath.

The winter rains water the ground sufficiently to allow cereals to be grown without irrigation. On some of the *haciendas* motor-tractors and other modern machinery are used, but on most the ground is still turned with iron or wooden ploughs, drawn by teams of oxen. Sheep are reared for mutton and wool, the latter product being also obtained from alpacas, and llamas, which are used for transport in mountainous districts. Beef and dairy cattle are bred, mainly in the wetter and cooler southern part of the valley, but supplies of meat are insufficient to meet the demand and much is imported from the pampas of Argentina.

Approximately three-quarters of the 4,250,000 people in the country live in Central Chile. *Santiago* (700,000), the capital, stands on a plateau, backed by the Andes, whose snow-clad peaks present a striking contrast to the irrigated lands around the city. Many of the houses are one- or two-storied buildings which are better able to withstand earthquakes than taller structures. Most of the shocks are slight, but sometimes they inflict great damage, as in the convulsion of January 1939, which partly destroyed Concepcion, laid in ruins a number of smaller towns, and devastated a vast area in Central and Southern Chile. It is 150 miles from Santiago to Valparaiso, but the electric train soon covers the distance, and in less than two hours the traveller passes through the tunnels of the Coast Range whence, on emerging, he sees Valparaiso Bay, from whose shores houses climb to the encircling hills. The western terminus of the 800-mile Transandine Railway, *Valparaiso* (193,000) is the second largest city in Chile, and the chief port on the Pacific seaboard of America south of San Francisco. Its harbour, which provides the only really good anchorage on the west coast of South America, is sheltered on the south from the westerly gales of winter, and on the north is protected by breakwaters. Like other west coast

ports its trade benefited by the construction of the Panama Canal, which enabled the voyage to Europe, and the east

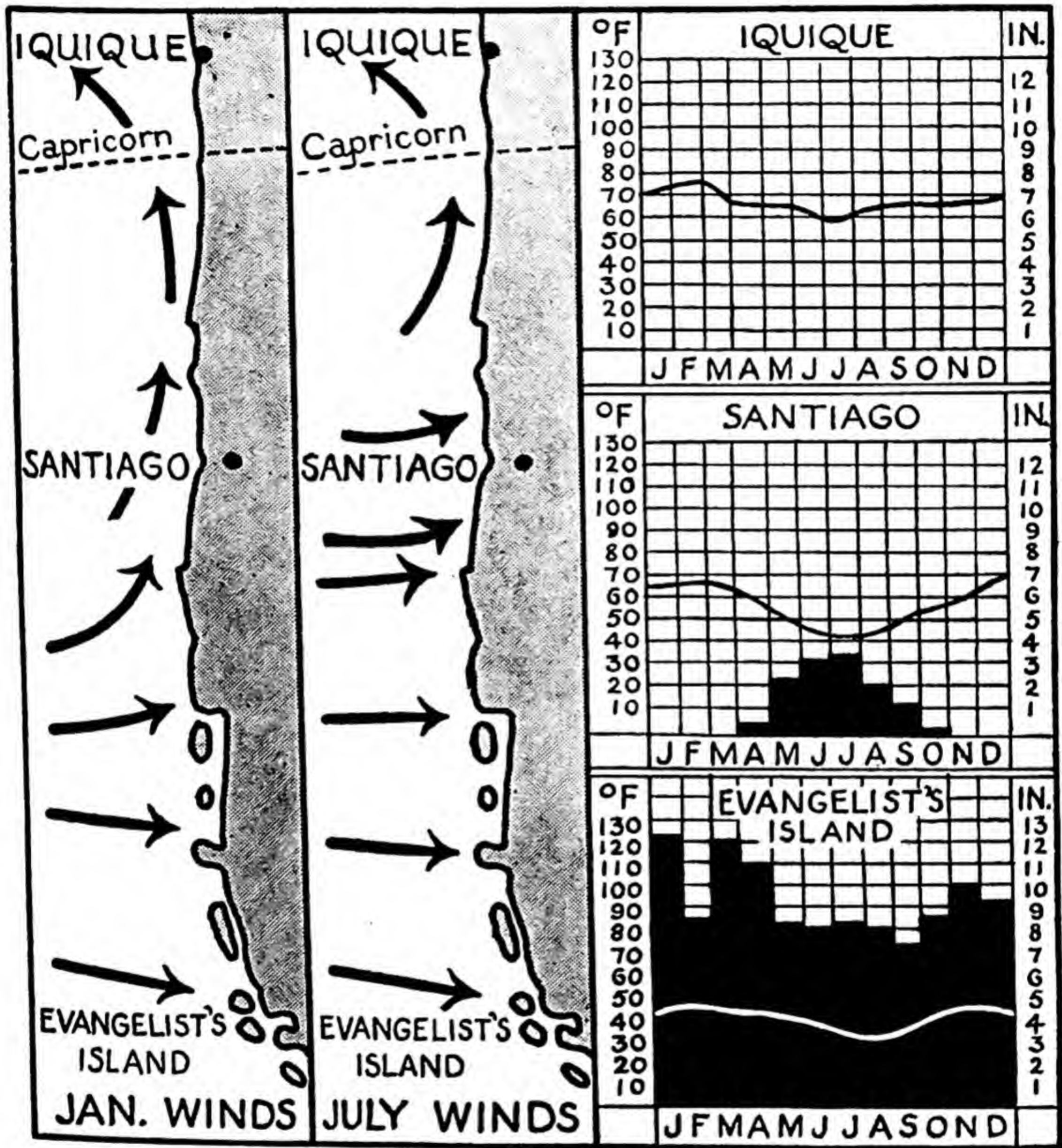


FIG. 27. Chile: Climate.

coast ports of the United States, to be shortened by several thousand miles. Valparaiso imports and refines sugar; manufactures rolling stock for Chile's 5,500 miles of rail-ways; and makes carts and furniture with timber imported

from *Valdivia* and other ports still farther south. *Concepcion*, which lies north of the last-named port, exports rather low-grade coal mined in the vicinity, and is the chief outlet for the southern part of the Vale of Chile.

Northern Chile—the Rainless Coast

The Atacama Desert of Northern Chile is the driest region in the world, for along this arid strip, backed by the barrier of the Andes, the South-East Trades blow off-shore at all seasons. Astonishing though it may seem, this sun-scorched land, with its harbourless coast, is the chief source of Chile's wealth. From it are obtained nitrates and copper, which together make up ninety per cent. of the country's exports. The entire world supply of natural nitrates comes from Chile.

Life-giving rain is not wanted here, for the presence of the *nitrates* is due to the fact that no rain falls to wash the salts out of the soil. The nitrate belt extends through the Atacama Desert for 450 miles. It is situated at a distance of from 15 to 90 miles from the coast, at elevations varying from 3,500 to 10,000 feet. The vast deposits lie only a short distance below the surface. After the workers have removed the covering layers they dig up the nitrates, which are loaded on trucks and taken to the *oficinas*, or refineries. Here they are crushed and then dissolved in water to separate the salts from the soil and rock with which they are mixed. The solution is next evaporated and the salts crystallized out. The nitrates are then sent down by rail to Iquique, Antofagasta, and Caldera, where the sacks are slung aboard big lighters, which convey them to vessels anchored some distance from the shore. Nitrates are shipped to the United States, Europe, and Asia for use as fertilizers, and large quantities are supplied to factories in many parts of the world for making nitric acid. *Iodine* is a by-product obtained from nitrates.

Before the construction of the railways the nitrates were



5. THE WORLD'S LARGEST COPPER MINE

From the aeroplane we get a good impression of this huge copper mine in Chile. The mine buildings are in the foreground. The snow-capped peaks of the Andes, seen in the background, present a refreshing contrast to the rainless mining area, to which water is piped from mountain reservoirs (see p. 71)



6. IN THE HIGH ANDES

(Left) On the way to the *yungas*. It is a good thing these mules are sure-footed, for they will have to pick their way carefully down the *yungas*, those steep tropical valleys that trench the eastern side of the Central Andes (see pp. 75-6). (Right) Ponchoed Indians crossing Lake Titicaca in their *balsas*. Both the hull and the sails of these native boats are made of reeds growing by the waterside. The long pole can be used for punting the boat through shallow water (see p. 74)



carried to the ports on the backs of mules and llamas. In pioneer days it was necessary to take water to the *oficinas* and mining camps in barrels, but now water is brought to the nitrate fields and the ports through pipes running from mountain reservoirs lying amidst the Andean snows.

Chile supplies one-fifth of the world's *copper*. The chief mines are found in the mountains behind Antofagasta, and near Copiapo, La Serena, and Coquimbo, where shafts have been sunk and mining camps are dotted over the barren land (Plate 5). Some ore is smelted at the mines and exported as copper bars; but because of the lack of suitable coal the bulk is sent for smelting, by way of the Panama Canal, to refineries at ports in the Eastern United States.

Owing to the wealth of this region, *Antofagasta* (60,000) is the fourth largest and most modern town in Chile. Like *Arica*, near the Peruvian frontier, it is the terminus of a railway from Bolivia, exporting tin from that country in addition to nitrates from the Atacama Desert. The main line from Antofagasta to Santiago (835 miles distant), running through the sun-baked valley between the Coast Range and the main chain of the Andes, is connected by branch lines with ports, of which *Caldera* is the chief copper exporting centre. But most of those who travel up and down the coast prefer the pleasanter sea voyage, or the quicker journey by air.

BOLIVIA

A Land without a Seaboard

It takes fifty-four hours to go by train from Antofagasta to La Paz, the largest town in Bolivia. In this journey the traveller ascends from sea-level to over 13,000 feet, and passes from the burning heat of the Atacama Desert to the bleak cool Plateau of Bolivia. High above the lofty table-land tower the tumbled peaks and mighty ranges of the Andes, from whose snow-mantled slopes streams descend

to *Lake Titicaca*, the largest lake in South America, whose surplus waters flow south into Lake Poopo. As no rivers from this mountain-girt area reach the sea it forms a region of *Inland Drainage*.

Of Bolivia's 500,000 square miles of territory, three-quarters consists of the lowlands which lie on the east of the Andes, and include part of the forests of the Amazon basin

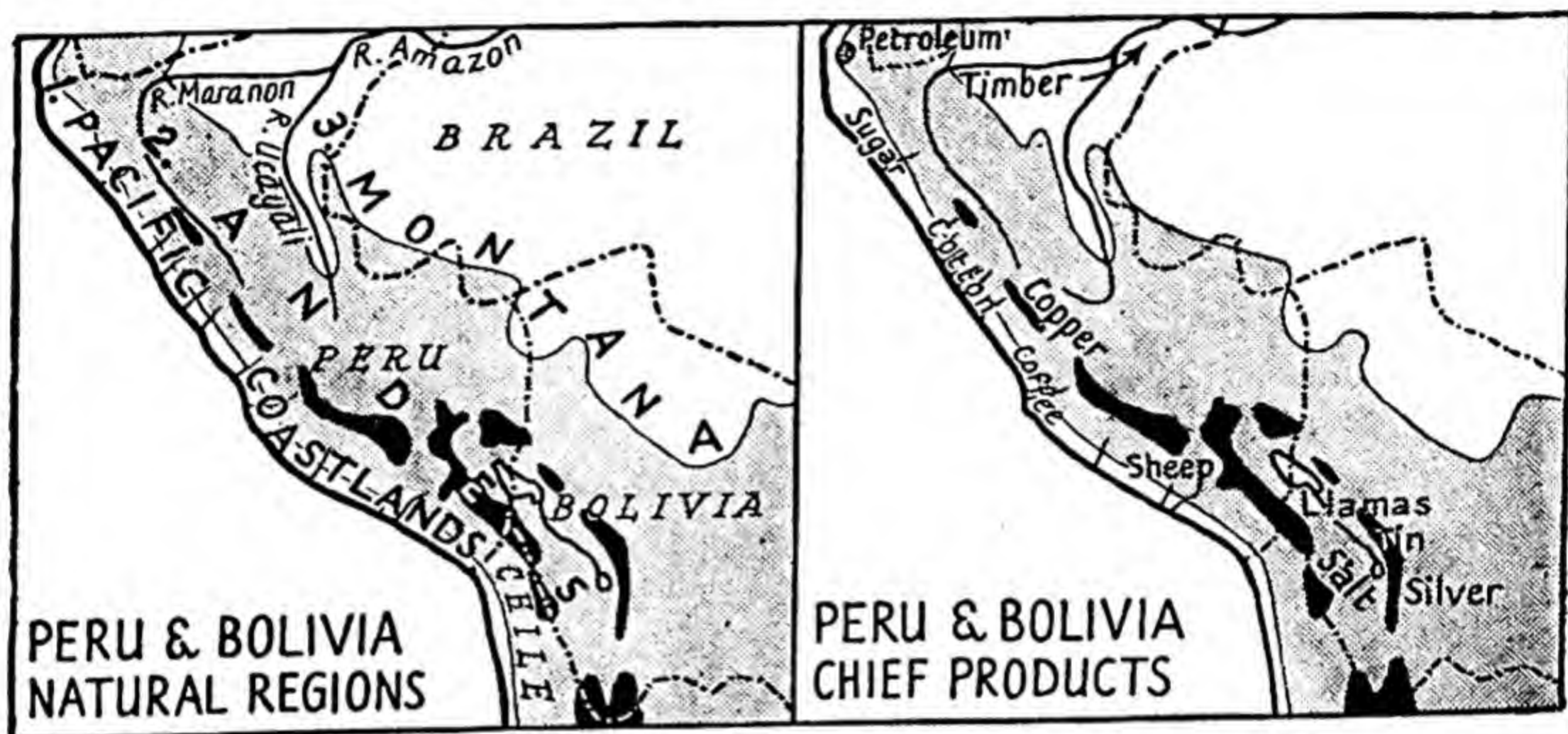


FIG. 28.

and those of the Gran Chaco. The *Plateau* and the *Eastern Lowlands* show many contrasts. Take the climate. Because of the encircling mountains the rainfall on the plateau is relatively small, and though this region lies wholly in the tropics temperatures are lower than they would otherwise be because of its elevation. But owing to the rarity of the atmosphere and the general absence of cloud, the sun's rays shine down with great intensity during the day. At night, however, on account of the clear dry air, heat radiates rapidly, temperatures fall quickly, frosts are usual, and in winter the cold is often severe. On the other hand, the lowlands on the windward side of the Andes receive abundant rain, and temperatures are always high. The plateau is rich in minerals, the chief source of Bolivia's wealth. The lowlands yield rubber, coca, and cacao, but

owing to their unhealthy climate, dense vegetation, and their difficulty of access, they are little developed. Thus, of the 3,000,000 inhabitants of Bolivia, at least eighty per cent. live on the plateau, and the lowlands are thinly peopled.

Like its neighbour Paraguay, Bolivia has no seaboard. Its ocean commerce passes by rail to the Chilean ports of Antofagasta and Arica, and the Peruvian port of Mollendo. There is also direct communication between La Paz and Buenos Aires, 1,700 miles distant. Some river trade is carried on down the Madeira and other tributaries of the Amazon, and a little by way of the Paraguay and the Parana to the Plate estuary.

The Plateau: Life at over 12,000 feet above Sea-level

The Plateau of Bolivia, lying in the heart of the Andes, has an elevation ranging from 12,000 to 14,000 feet above sea-level. Except in the valleys, the climate is too severe for trees: only hardy bushes, and crops like potatoes and barley, thrive on the thin rock-strewn soil. The hill-sides are often cut into terraces, where crops are grown on narrow strips from which enough stones have been removed to make cultivation possible. Farming methods are primitive. The land is turned with crude wooden ploughs; seed is sown broadcast; grain is cut by hand, and threshed with flails, or trodden out by oxen.

Over the land, tilled and untilled alike, wander sheep, mules, oxen, donkeys, and especially flocks of llamas and alpacas which yield wool and hides. The llamas are shorn twice a year and their wool is woven into blankets, ponchos (cloaks), sandals, and hats. These camel-like creatures provide milk and meat for the Indian family's larder, and their bones are fashioned into implements, such as the bobbins on which the women wind their wool as they sit outside their tiled *chozas*, or huts. Llamas are much used for transport in the High Andes, for the tough soles of their feet

enable them to obtain a firm grip on mountain trails too steep and rough even for sure-footed mules. Bearing loads of from 75 to 100 lb. they cover about 12 miles a day, travelling over tracks which in places are scarcely a couple of feet wide, with a precipice often dropping down to 3,000 feet or more on one side. In Bolivia a motor-car is seldom seen except in the towns or on one of the new motor roads, where it is a sight rare enough to excite the curiosity of the Indians, who rush after it to try to find out how it can travel without visible means of traction. Railways provide communication with the outside world, but as their total length is only 1,300 miles it is obvious that they cannot furnish adequate facilities for conveying either goods or passengers. Wagons and carts are unknown, but in addition to llamas and mules, goods are carried by Indian porters, who journey long distances and, by taking short cuts across the mountains, often cover the ground in less time than a llama, or a man on a mule. Bent almost double under their heavy loads, they sustain themselves by chewing coca leaves, which they keep in little bags slung from their belts. These men also carry the mails and act as guides to travellers wending their way over the paths linking the isolated villages.

On Lake Titicaca British-built steamers ply between the Bolivian and Peruvian shores. Most of the Indians, however, travel over the shallow waters in *balsas*, large enough to carry both passengers and animals. These boats, which as we can see (Plate 6) look rather like huge clogs, are made of reeds from the lake-side, both hulls and sails being constructed of this material. Reeds are also used by the waterside peoples for thatching their adobe huts, and for weaving baskets, hats, and clothing.

The chief wealth of Bolivia comes from its tin, silver, and copper mines, the country ranking second only to Malaya in its output of tin. The principal tin-mines lie round Oruro, Potosi, and La Paz. Much ore is sent to South

Wales for smelting, whence it is reshipped as tin-pigs to the United States. Copper, tin, and wolfram are mined round Oruro, and some silver is obtained round Potosi, a famous centre in Inca times.

Journeying northward from Oruro, the traveller catches his first glimpse of Illimani, the great volcanic cone, whose glacier-filled valleys and snow-white crest rise in solitary splendour above the sierras around. For hour after hour the train rumbles on over the level surface of the plateau. Then almost without warning the line descends into the canyon-like valley where *La Paz* lies 1,200 feet below the table-land above (Plate 2). The seat of the government, and with a population of 150,000, the city is a mixture of old and new. The streets run up hill and down dale, but owing to the elevation even the energetic visitor is soon out of breath after walking a short distance. Some of the streets are broad thoroughfares lighted with electricity; others are mere lanes, so narrow that only at midday does the sun shine down upon their cobble-stones. The most interesting place in La Paz is the market, where dusky Indian women, clad in gay dresses, with shawls wrapped round their shoulders and tall brimless hats perched on their heads, squat before their wares. Some are selling potatoes varying in size from peanuts to tennis-balls; some are displaying ponchos, woven from the wool of llamas and alpacas, and brightly coloured with vegetable dyes; and others are trying to persuade prospective customers to buy carved wooden figures or pottery. The square swarms with people, including white folk, *mestizos*, and full-blooded Indians.

The Eastern Lowlands and the Yungas

If we were to follow one of the mountain trails winding down the eastern slopes of the Andes we should pass from a region of icy cold to one of intense heat, and from glaciers and snow-fields to tropical forests. From the *punas*, or

high plateaux, which are almost enclosed by the surrounding sierras, precipitous ravines lead to the *Montana* region with its forests of valuable timber and flowering shrubs, like the cinchona from whose bark quinine is manufactured. From the *Montana* we could descend to the lowlands by one of the steep tropical valleys, called *yungas*, which trench the lower slopes of the Cordilleras. Our mules pick their way carefully along the track winding through the verdant valley where far below a river, gleaming like a silver thread amidst the greenery, rushes onward to join the Amazon. Passing a coffee plantation we reach the mud huts of an Indian village. Near by the steeply sloping hill-side is cut into narrow terraces each of which is just wide enough to hold a single row of coca bushes. How picturesque the Indian women look as bending low they gather the leaves, or spread them out to dry in the blazing sun! Not far away swarthy men have just finished loading a convoy of mules with sacks filled with coca leaves. Soon the little caravan will start on its arduous journey up the *yunga* to the heights above and the Bolivian Plateau beyond, where at La Paz the coca leaves will be manufactured into cocaine.

Still dropping, our trail runs beside a cacao plantation and then turns down to the now wide river. The air grows hotter and moister. Steam rises from the stream and wreathes the feathery crests of the palms around. With every mile we go the vegetation grows more and more luxuriant. Then the gradient lessens and we pass imperceptibly into the virgin *selvas* which stretch north-eastward for several thousand miles to the Atlantic, while south-eastward they merge into the more open jungle of the Gran Chaco.

We are in the heart of untamed Bolivia. Beyond us stretches a tangled sea of vegetation covering some 2,000,000 square miles. Here and there, in these vast *selvas*, *seringueiros* are tapping trees yielding rubber, which will eventually find its way down the Madeira or some other

Amazonian waterway to the Brazilian port of Para, many weeks' journey distant. Bolivia ranks second to Brazil as a rubber-producing country of South America, but compared with her minerals, her export of this commodity is negligible.

PERU

Cradle of Two Civilizations

Peru formed the heart of the Inca Empire and the cradle of the Spanish power in South America. Though slightly smaller than Bolivia, its population is twice as great. Of its six million inhabitants, nearly half are Indians, about a third are *mestizos*, and the remainder are mainly of white descent. But unlike Bolivia, which in many other respects it resembles, Peru has some 1,400 miles of coast-line and thus has direct access to the Pacific, an advantage that has proved of great benefit especially since the opening of the Panama Canal.

Peru may be divided into three regions: (1) the Pacific Coast-lands, with an average width of 30 miles; (2) the Andean region; and (3) the Forests of the Montana which sink to the Amazon Lowlands.

The Pacific Coast-lands

There is not a single good natural harbour along the Peruvian seaboard, and at nearly all ports goods have to be carried by lighters between the steamers and the docks. Like the adjacent region of Chile, the coast is practically rainless, but the tropical heat is somewhat lessened by the cold Peruvian current, and occasionally in winter, when heavy fogs drift in from the Pacific, the weather is quite cool. Yet despite its arid nature and its uninviting shores, this part of Peru is the most important region in the country, for streams descending from the Andes provide water for irrigating numerous valleys as well as rich alluvial soil on which a variety of crops are grown. These verdant valleys,

forming populous oases amidst stretches of desert, have been aptly termed 'Little Egypts', for they depend for their fertility on the life-giving waters and rich silt brought down by the rivers and spread over the land. In many areas the irrigated plantations are connected with the ports by short railways some of which are worked by electric power obtained by harnessing mountain streams.

Though in some valleys we should see coffee fazendas and vineyards on the warm northern slopes, yet by far the most important crops are *cotton* and *sugar-cane*, the chief agricultural exports of Peru. Cotton is widely cultivated, but the sugar-growing area is confined to the warmer north, where the old Spanish town of *Trujillo*, 9 miles from the coast, is the centre of the industry.

The coastal region is noted for *petroleum*, Peru's principal export, which is obtained from oil-fields close to the frontier of Ecuador. The Incas obtained petroleum by digging shallow wells in the oil-bearing sands. But it was not until the close of the nineteenth century that the first derrick was erected and the first well bored in northern Peru, where to-day are hundreds of derricks and storage tanks, whence the oil is pumped to *Talara*, the port of export.

From *Callao* (65,000), the chief port and second largest city in Peru, railway and motor-road run up to *Lima*, the capital, some 8 miles distant. Standing in the broad valley of the Rimac, about 500 feet above sea-level, the city has a population approaching 300,000. Though a modern town, numbers of buildings dating from the time of the Spanish Conquest make Lima one of the most picturesque places in South America. Unfortunately, like many other centres in fold-mountain areas, it suffers from earthquakes, and, partly on this account, many of the houses have very thick walls to enable them to withstand the shocks. Farther south, close to the Chilean frontier, the railway from Bolivia runs through Arequipa to the Peruvian port of Mollendo, set beside a rocky, surf-beaten shore.

The Andean Region

Between the three parallel ranges of the Cordilleras, which traverse Peru from north to south, lie deep valleys and lofty plateaux. On these bleak and treeless uplands life has changed but little with the passing centuries, and the



FIG. 29. Peru and Bolivia: Relief, Communications, and Irrigated Areas.

Indians live much as their ancestors did in Inca times. They grow barley, potatoes, and other hardy crops, but their farming methods are crude and very different from those of the people in the coastal valleys. They make no attempt to turn over the soil, but merely stir its surface with a crude plough, drawn by oxen, which consists of a sharpened board with an iron point, and having an iron handle by means of which the farmer keeps it upright. Barley is sown broadcast, while potatoes are usually planted

in rows about 6 feet apart. Scattered flocks of llamas, alpacas, and sheep browse on the rough herbage. Some of their wool is spun and woven on hand-looms into ponchos and blankets. Much, however, is carried on the backs of llamas, or sent by rail, to *Arequipa*, the chief collecting centre to which wool is sent from all parts of the uplands. In the warehouses and sorting-sheds the wool is graded by Indian women, then packed in sacks and dispatched by rail to Mollendo for export. The third largest town in Peru, *Arequipa* stands at an altitude of 7,600 feet in an irrigated valley overlooked by the snow-capped volcano of El Misti. From Arequipa the line climbs up to *Puno*, the Peruvian port on Lake Titicaca, from which there is a steamer service to Bolivia. North-west the railway runs to *Cuzco*, lying in a broad and fertile valley encircled by barren hills. Life moves in leisurely fashion in this old-world city, where most of the streets are so narrow that wheeled traffic is impossible. Its chief interest, however, lies in the remains of its temples, palaces, and fortresses, which remind the traveller that it was the capital of the Inca Empire.

Mining. In Inca times, Peru was famed for its gold and silver, and though compared with that of South Africa or Australia its output of gold is small, yet in the production of silver it ranks fourth in the world. At the present time the export of copper rivals that of silver. The chief copper-mines are at *Cerro de Pasco*, an up-to-date mining centre situated at a height of over $2\frac{1}{2}$ miles above sea-level. The ore is sent by rail to Oroya, the terminus of the Transandine Railway, where, after being smelted over local coal, it is dispatched in the form of copper bars to Callao, some 250 miles distant.

Transport. In the whole of Peru there are only 2,600 miles of railways. Yet this is scarcely surprising when we remember the steepness and breadth of the Andes, and the great height of the passes, which render rail and road construction extremely costly. Some idea of the engineering difficulties

encountered in the building of such a railway as the Trans-andine line from Callao to Oroya, on the eastern side of the Cordilleras, may be grasped when we learn that between Lima and Cerro de Pasco there are 61 tunnels, 41 bridges, 13 spiral bends where the line almost doubles back on itself, and numbers of Y-shaped switches at reversing points (Plate 7). The Galera tunnel pierces the crest of the Andes at a height of 15,693 feet—higher than Mont Blanc, the loftiest peak in Europe. A motor highway, with hundreds of hair-pin bends, completed in 1935, runs from Lima to Oroya, whence it is continued to the upper Ucayali river, thus making it possible to travel by road and river from the Pacific to the Atlantic. Recently other roads have been built, and gradually the lorry and the motor-car are replacing llamas as a means of transport in the high sierras. Air services link Lima with a number of other towns in Peru, as well as with Buenos Aires and New York.

The Forests of the Montana and the Amazon Lowlands

This huge area, comprising two-thirds of Peru, and cut off from the rest of the country by the barrier of the Cordilleras, is as little developed and thinly peopled as the adjacent region in Bolivia. In the Montana forests, spreading along the eastern slopes of the Andes, coffee, cacao, coca, and cinchona trees are cultivated. These forests also yield valuable timbers, such as mahogany, cedars, and oaks, some of which are floated down to sawmills at *Iquitos*, standing at the point where the Ucayali and Marañon unite to form the Amazon. Owing to the treeless nature of Western Peru, there is a great demand for timber in the Pacific Coast-lands, but so great are the difficulties of transport across the Andes that it is considerably cheaper to ship it from San Francisco to Callao, a distance of 4,600 miles, than to bring it from Iquitos for 700 miles over the mountains.

The healthy Montana forests, which are suited to white settlement, are very different from those of the unhealthy Amazon lowlands. Before the advent of plantation rubber, much wild rubber was collected in the latter region. Now, however, the trade is relatively unimportant, though some









FOREIGN TRADE OF PERU			
EXPORTS		IMPORTS	
Petroleum		Food & Drink	
Cotton		Machinery	
Cane Sugar		Cotton Goods	
Copper		Woollens	

FIG. 30.

rubber is still sent to Iquitos, whence it is dispatched by steamer down the Amazon to Para, 2,300 miles away.

EXERCISES

1. (a) Draw a sketch-map to show the three natural regions into which Chile may be divided. On your map print boldly the name of each region. (b) State, giving your reasons, which of the above regions is best suited for settlement. (c) Which of the regions is the greatest source of wealth to Chile? Name *three* exports from this region.

2. (a) Name *three* ports on the west coast of South America from which we might travel by rail to La Paz, the largest town in Bolivia. (b) Describe the journey from *one* of these ports to La Paz.

3. Certain districts in Peru are known as 'Little Egypts'. Where are they? Why are they so called? What are their chief crops?

4. (a) Select three ports on the west coast of South America and say why each is important. (b) From what disadvantage do nearly all the ports along this coast suffer? (c) What large-scale engineering work in recent years proved of great benefit to their overseas trade?

5. Describe the different forms of transport (apart from rail) in the Andes.

6. Show how the people living in the high Andes adapt their mode of living to their surroundings.

CHAPTER VIII

THE NORTHERN ANDEAN COUNTRIES—
ECUADOR, COLOMBIA, AND VENEZUELA

Three Tropical Republics

ECUADOR, Colombia, and Venezuela show many resemblances. Each has an extensive coast-line, but whereas Ecuador faces the Pacific and Venezuela the Atlantic, Colombia has the advantage of fronting both oceans, and is thus best placed for trade with Europe and the Eastern United States on the one hand, and with the west coast ports of South America on the other. The three Republics lie wholly within the tropics. They are traversed by the Andes and have extensive stretches of lowlands and highlands, and in each the majority of the people either live in the ports or on the higher, healthier uplands.

We may divide this area, as a whole, into four main regions. (1) The coastal lowlands, forming the *tierra caliente*, or hot zone, are wet, forested, and unhealthy. (2) The *llanos* of the Orinoco basin, which rise on the south to the Guiana Highlands, and extend from Colombia eastward through Venezuela, have a hot wet season followed by a cooler dry season. (3) The Andean region, with valleys and high plateaux lying between the Cordilleras, consists of a warm zone, the *tierra templada*, which rises to cooler highlands, known as the *tierra fria*. (4) The *selvas* of the Amazon lowlands stretch from Brazil into all three of the North Andean states.

ECUADOR

The Land Athwart the Equator

Ecuador, whose name simply means 'equator', is about two and a half times the size of the British Isles, and has a population of 2,700,000. Some of the people are of Spanish descent, some are *mestizos*, but the majority are Indians.

Both the Pacific Coast-lands and the *selvas* of the Amazon are densely forested, but whereas the latter are almost undeveloped, the Coast-lands are the most productive part of the country. Cacao—the principal crop—sugar-cane, cotton, and bananas are grown in the *tierra caliente*, while

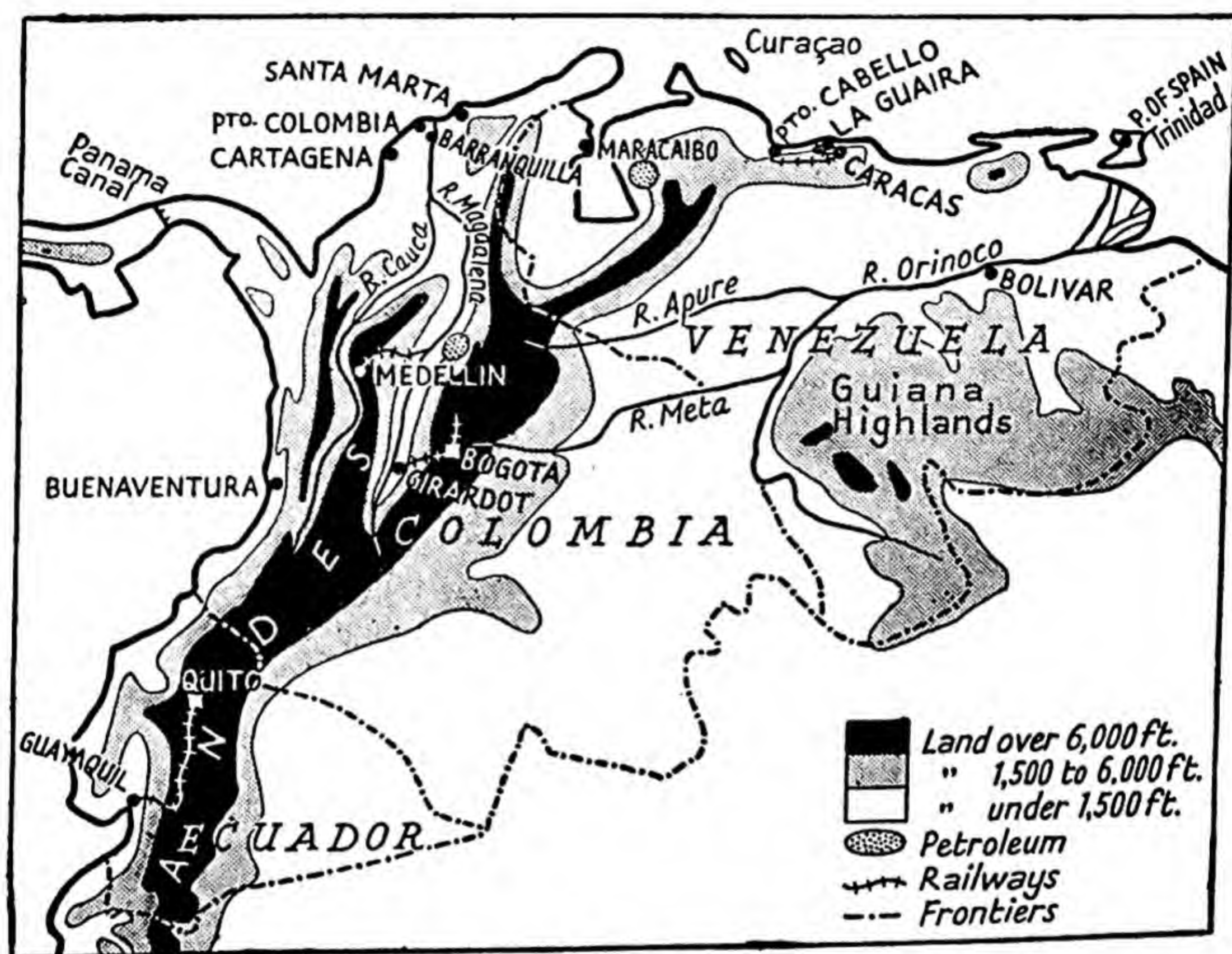


FIG. 31. Ecuador, Colombia, and Venezuela.

on the higher slopes of the *tierra templada* are coffee plantations. An interesting industry is the manufacture of Panama hats by Indian women in their homes. The hats are woven from the fibres of the toquilla palm, and the women, sometimes half-crouching on the floor with the hats in front of them, dampen the silky threads and plait them at the same time. Though they are skilled and rapid workers, they take six weeks to make a single hat. Hence it is not surprising that such hats are expensive (Plate 8).

An increasing amount of petroleum is obtained from the

oil-fields on the north side of the Gulf of Guayaquil whence it is pumped through pipe-lines to the coast and there shipped aboard tankers. *Guayaquil*, at the head of the deep gulf, is the outlet for a fertile valley lying between the Coast Range and the main chain of the Andes. Picturesquely placed, it is the largest town and chief port of the country, exporting cacao, coffee, bananas, and Panama hats.

From Guayaquil a railway climbs through magnificent mountain scenery to *Quito*, the capital, 9,300 feet above sea-level. The distance is only 288 miles, but so steep are the gradients that the journey actually takes two days, allowing for a stop for the night *en route*. Though Quito lies within 15 miles of the Equator, it is never hot, and throughout the year its climate resembles that of a warm English spring. Its setting is superb; snow-capped volcanoes, like Chimborazo and Cotopaxi, rise in frozen splendour high above the plateau on which it stands. The Indian peasants live in much the same way as their neighbours on the high plateaux of Peru. Their farming methods are primitive, their tools crude, and their crops of barley and potatoes poor.

✓ COLOMBIA

Colombia, the largest and most progressive of the three Republics of the North Andean region, has a population of one and a half times that of Venezuela and Ecuador combined. Of her eight and a half million inhabitants, about a third are white folk wholly or partly of Spanish descent, and the rest are Indians, *mestizos*, negroes, or a mixture of all three.

The Coast-lands. There are many banana plantations along the hot, wet lands of the Caribbean seaboard, where on the rich alluvial soils these tree-like plants, with their jade-green leaves from 6 to 10 feet long and 1 to 2 feet wide, grow in orderly profusion under the tropic sun. Each plant produces from 100 to 150 bananas, and the fruit grows upwards from the stem and not downwards as it is usually

seen hanging in our shops. On the plantations coloured labourers work under the supervision of white overseers. The fruit is sent by rail to Puerto Colombia and Santa Marta, the chief ports, whence it is exported to Britain and the United States.

Puerto Colombia, the outport of Barranquilla, is a city of 150,000 inhabitants. It stands on the Magdalena river, the chief highway of the country, from whose valley a number of short railways run up into the highlands. The pleasant old Spanish port of *Cartagena*, lying to the south, exports petroleum, which is pumped through pipe-lines from the oil-fields in the middle Magdalena valley, some 300 miles distant. To reach *Buenaventura*, on the Pacific coast of Colombia, ships pass through the Panama Canal, and thence along a steep coast, fringed with mangrove swamps above which rise the virgin forests that here clothe the lower slopes of the Andes. From Buenaventura a railway climbs up to *Cali*, near which coal is mined, a town lying in the Cauca valley, 3,400 feet above the sea.

The Andean Region. Colombia is crossed from north to south by the Coast Range and the three main chains of the Andes, between which lie high plateaux and valleys, like those of the Magdalena and its tributary the Cauca. From the Magdalena valley, a railway runs up to *Medellin* (150,000), the second largest city in the Republic, standing at an elevation of 4,800 feet. It is the centre of the chief coffee-growing area in Colombia, a country which ranks second only to Brazil in her output of this crop.

The route to Bogota goes up the forested Magdalena valley. From Barranquilla, the steamer works up stream for some 650 miles until it reaches the rapids where the river descends from the Andes. These are avoided by a railway journey of 70 miles, after which the trip is continued to Giradot by a smaller steamer. From Giradot a railway climbs up to Bogota, standing on a plateau at a height of 8,500 feet. This lengthy journey, which takes about nine days,

may be avoided by flying up the valley to the railhead which can be done in seven hours, and then proceeding by the train which takes another seven hours to reach Bogota. There is also another route to the capital by way of the recently completed motor road, 340 miles long, from Buenaventura.

Despite its somewhat inaccessible position, *Bogota* has a population of 350,000. In its elevation, its situation close to the Equator, its climate, and in the Spanish style of many of its buildings, the city resembles Quito, and like its sister capital it suffers from earthquakes.

Apart from the ports, all the largest towns in Colombia stand in the Andean region, which is far healthier than the hot wet lowlands. Here, too, scattered amidst the mountains, are many small mining centres producing gold, silver, copper, and emeralds. The Chivor mine is the only really active emerald-mine in the world, for the famous Muzo mines—also in Colombia—have been almost wholly closed down. Colombia ranks as the third country in the world for the production of platinum.

The Selvas and the Llanos. There are few towns, and none of any size, either in the *selvas* or the *llanos*. The former region is practically undeveloped. On the *llanos*, however, herds of cattle and flocks of sheep are grazed. Though producing meat and wool, the animals are reared mainly for their hides, which form an important article of export.

VENEZUELA

Though Venezuela is about three times the size of the British Isles it has only about three million inhabitants. The Andes, which run through the north of the country, separate the Caribbean Coast-lands from the Llanos of the Orinoco Basin.

The Caribbean Coast-lands. Many travellers make their first acquaintance with Venezuela when they land at *La Guaira*, whose beautiful harbour, backed by the Andes, pierces the coastal strip, with its cacao, sugar-cane, cotton,

and banana plantations. The most important part of the Coast-lands lies around Lake Maracaibo, where the town of *Maracaibo* lies in the midst of the oil-fields. The petroleum is obtained from wells sunk to the oil-bearing sands, some of which extend under the bed of the shallow lake. At the La Rosa field, on the eastern shore opposite Maracaibo, the derricks actually stand in the water. The existence of a sandbar at the mouth of the lake necessitates the use of specially built tankers, drawing only a few feet of water, to convey the petroleum from the fields. Some petroleum is taken to a deep-water station on the coast and transhipped to ocean tankers, but much is dispatched to the Dutch island of *Curaçao*, where it is refined before being exported. Petroleum provides three-quarters of the exports of Venezuela, which ranks as the third producing country in the world.

The Andean Region is the healthiest and most thickly populated part of Venezuela. There are many coffee plantations in the *tierra templada*, especially round the old-world town of Valencia, from which one railway runs to the coast at Puerto Cabello and another goes east through the mountains to *Caracas*. The last-named town, which is the capital, has a population of 135,000 and is by far the largest town in the Republic. It is only 6 miles in a straight line from La Guaira, but owing to the mountainous nature of the country, the railway traverses a distance of 27 miles in its tortuous climb of 3,000 feet.

The Llanos of the Orinoco basin extend from the lower slopes of the Northern Andes to those of the Guiana Highlands, and on the south-west merge gradually into the *selvas*. On these wooded savannas some two million cattle are reared mainly for hides. During the rainy season, from May to October, the Orinoco and its tributaries rise rapidly, causing floods during which thousands of animals are often drowned. But in the dry season, when large areas become so parched and dry that they are little better than a dusty

desert, many beasts perish through hunger and thirst. It is mainly for these reasons, and because of the lack of railways, that the *llanos* are not nearly so important a stock-rearing area as the pampas of Argentina.

The Orinoco and its tributaries are navigable for several thousand miles. Ocean vessels can ascend the Orinoco to Bolivar, 270 miles from the sea, and during the flood season

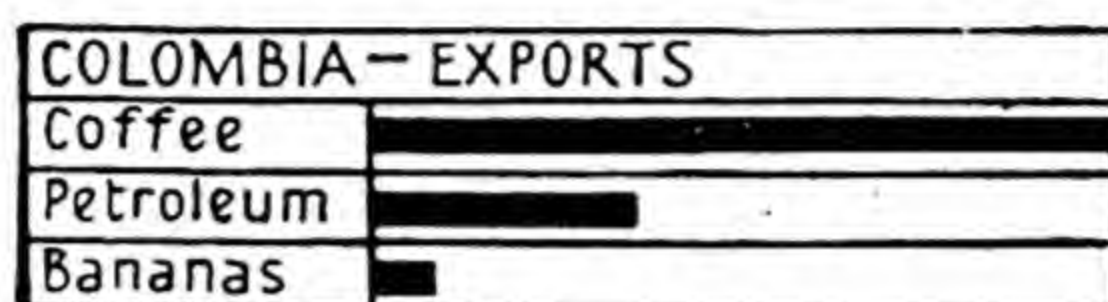


FIG. 32.

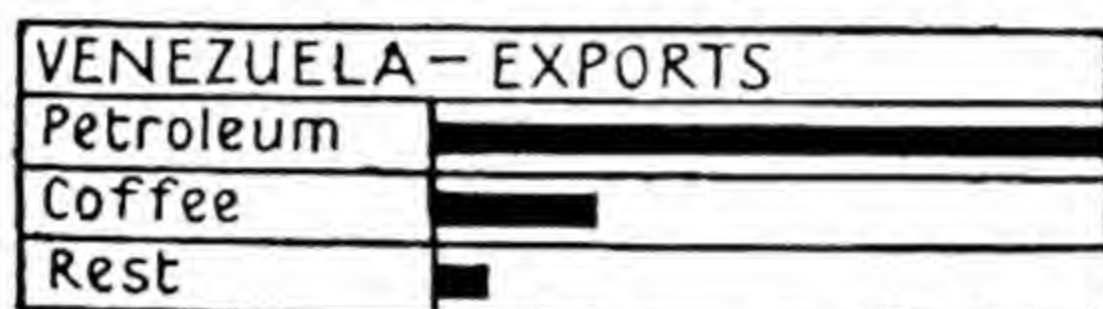


FIG. 33.

river steamers can travel up stream some distance into Colombia. *Bolivar*, a town of 20,000, is the chief centre of the *llanos* region, collecting hides and skins, wild rubber from the *selvas*, and gold mined in the Guiana Highlands to the south. Most of these products are conveyed by steamer to Port of Spain, the capital of Trinidad, where the bulk are transhipped to vessels bound for La Guaira and Puerto Cabello. But quantities are sent from Bolivar to Caracas by the new motor road connecting these towns.

EXERCISES

1. (a) Draw a sketch-map of the North Andean countries. Shade the high land. Then print boldly over the appropriate areas the names of the four chief regions. (b) Select one of these regions and show how the life of the people there is affected by their environment.
2. Give an account of a journey by rail and river from Bogota to Puerto Colombia.
3. Describe the position of three oil-fields in this region. In the case of *one* of them say how the petroleum would reach refineries at Swansea, South Wales.

CHAPTER IX

FIXING POSITION ON THE GLOBE

Day and Night

THOUGH the Earth appears to us to be stationary it is, in fact, spinning on its axis, an imaginary line the ends of which we call the North and South Poles. Just as the Earth has an imaginary axis on which it turns, so an imaginary line is supposed to be drawn round it midway between the poles. This is called the Equator, that is the line dividing the globe into two equal parts.

The Earth rotates on its axis once in every twenty-four hours. It spins from *west* to *east* and, as it rotates, any particular part gradually passes under, and then turns away from the Sun, until at last the latter is no longer visible. Hence the Earth's movement on its axis gives us the phenomena of day and night: any place on the surface of the Earth has day when it faces the Sun, and night when it is turned away from it.

When the Sun is highest in the heavens at any place it is midday. In the Northern Hemisphere our shadows point due north at this time. If the *midday line*, cast by our shadow, were produced far enough, in both directions, it would pass through the North and South Poles.

If we lived at Buenos Aires, or some other place south of the Tropic of Capricorn, our shadows at midday would *always* point due south.

S O S (· · · — — — · · ·)

We all know that when a ship is in danger of sinking, the wireless operator sends out the S O S signal. The captain of any vessel that receives the signal hastens to the aid of the disabled boat. He knows the exact spot to which he must proceed, for the operator of the distressed ship sends

further information stating his exact position on the ocean. In short, he gives his latitude and longitude.

Latitude

In Geometry we learn that a circle is divided into 360° ; and since the circumference of the earth is practically a

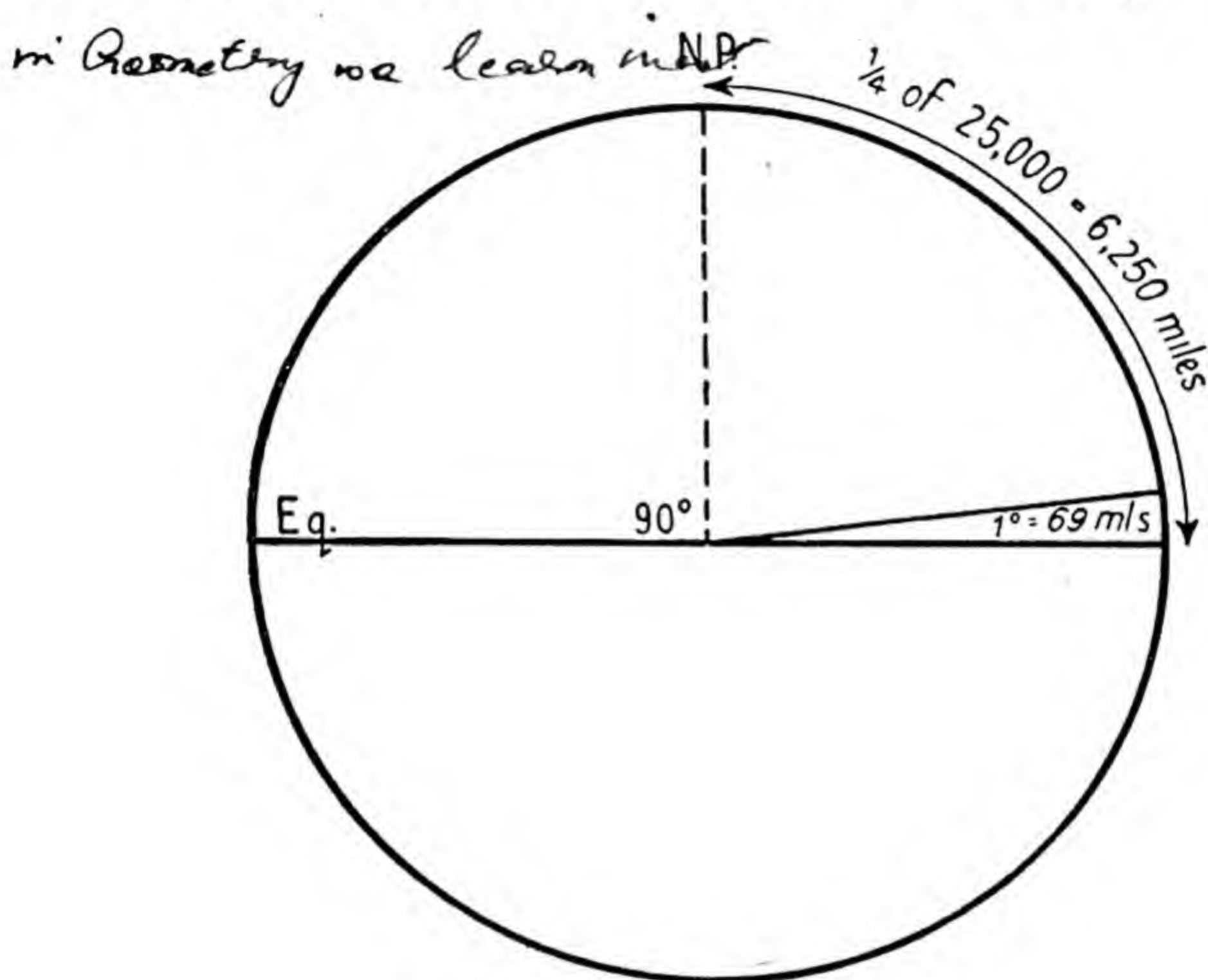


FIG. 34. Length of a degree.

circle, that also is divided into 360° . The distance between the Equator and the North Pole, being one-quarter of the distance round the Earth, is 90° .

Distance north or south of the equator, measured in degrees, is known as latitude.

On the globe, latitude is shown by circles drawn parallel to the Equator, at equal distances apart, but, of course, growing steadily smaller towards the Poles. The latitude of the Equator being regarded as 0° , that of the North Pole is 90° N., and that of the South Pole is 90° S. The latitude of a place midway between the Equator and the Poles is

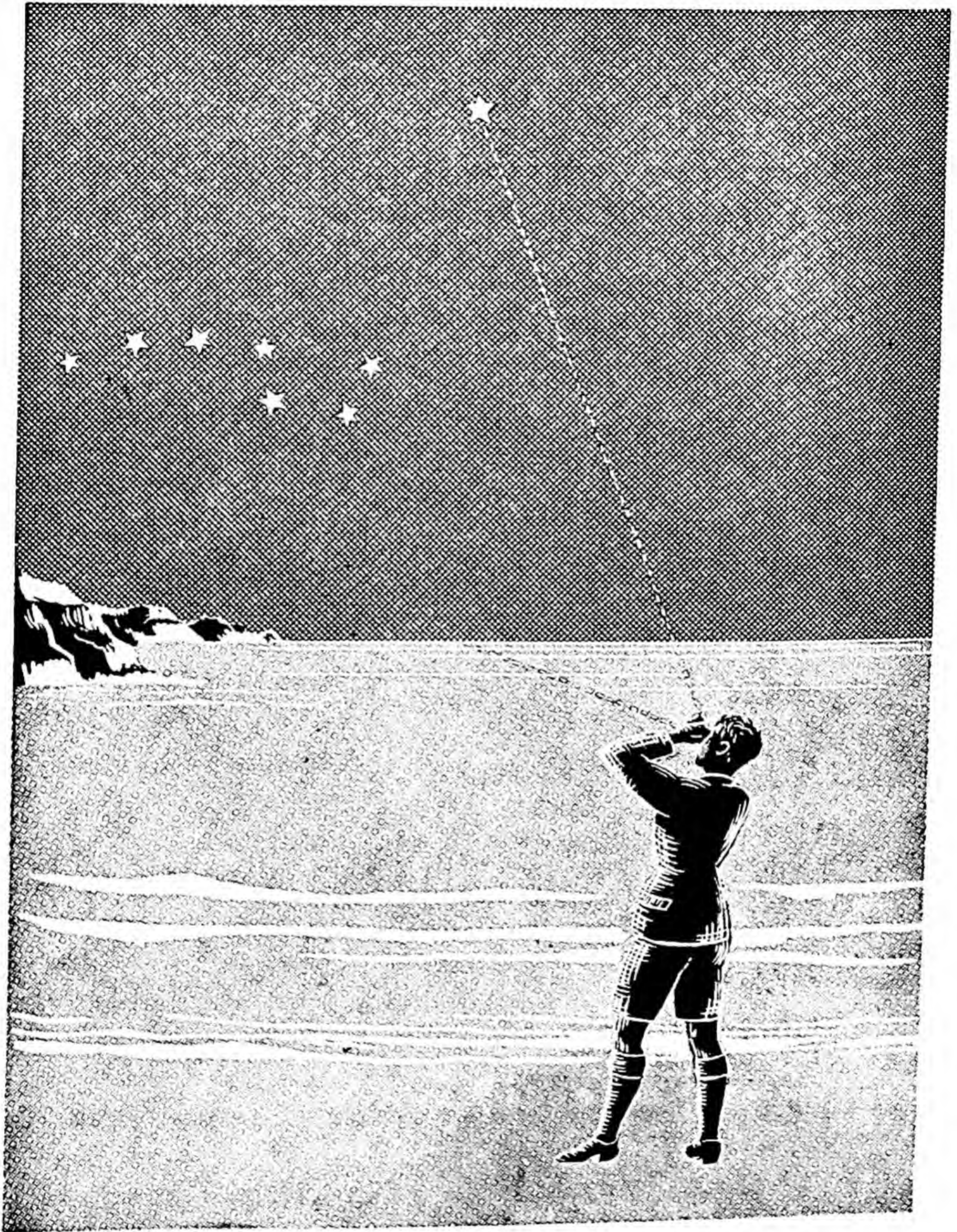


FIG. 35 A. FINDING LATITUDE BY THE POLE STAR

This figure shows how latitude may be determined by the Pole Star (see p. 93). On a clear night it is easy to locate the group of stars (*left*), which are usually known as the *Plough*. The two stars on the right of this group are called the *Pointers*, because they point to the Pole Star.

45° N. or 45° S. For all practical purposes, the Earth may be regarded as a sphere with a circumference of 25,000 miles. The distance from the Equator to either Poles is a quarter of this, that is 6,250 miles. As this distance represents 90° of latitude, an easy calculation shows that:

$$1 \text{ degree of latitude} = \frac{6250}{90} = 69.4 \text{ miles, or } 70 \text{ miles}$$

(approximately) (see Fig. 34).

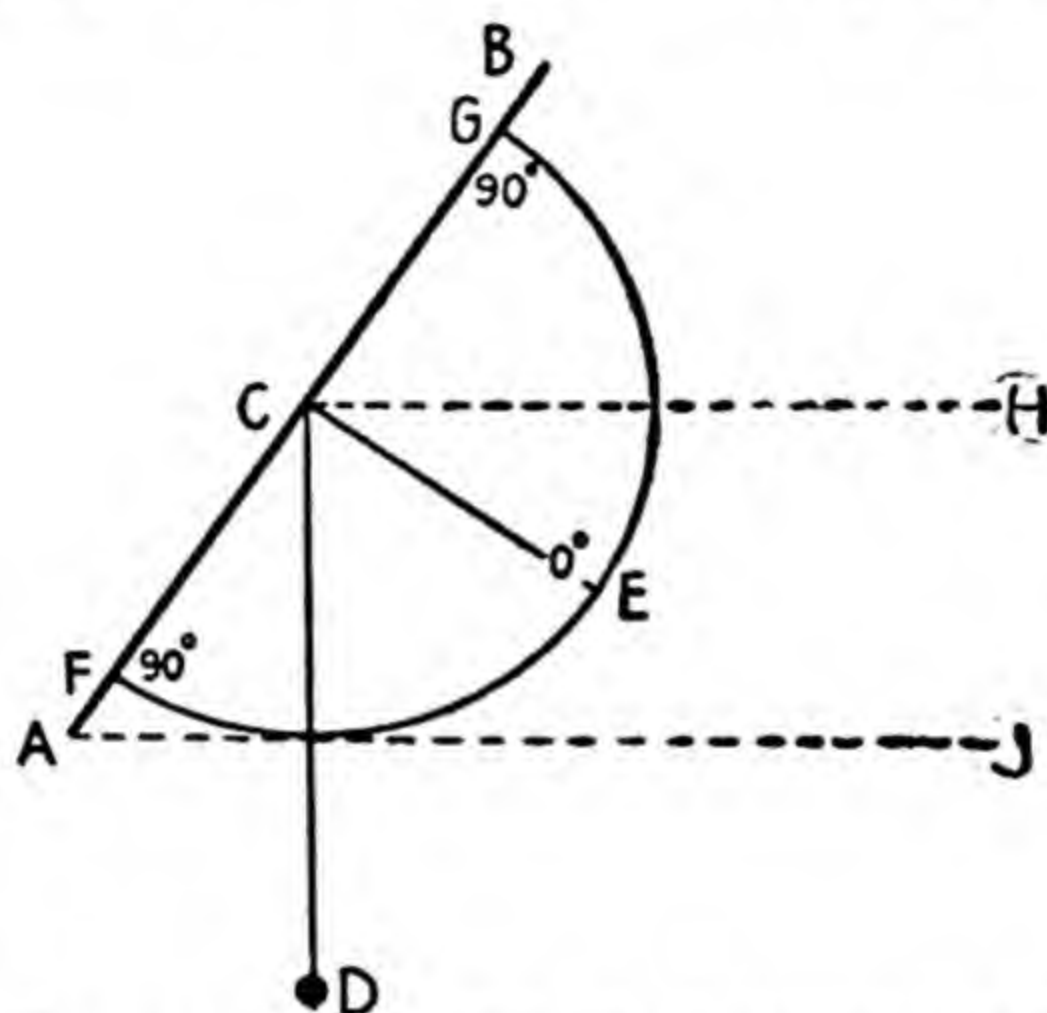


FIG. 35 B. TO FIND LATITUDE

The altitude of the Pole Star may also be determined by making a simple clinometer (as above). AB is a lath with sights at A and B . CD is a plumb line, FEG is a semicircular scale, with zero (0) at E , and reading 90° each way. If AB is sighted on the Pole Star, then $\angle BAH =$ the altitude of the Pole Star $= \angle BCH = \angle ECD$, i.e. the angle between the plumb line and E (zero).

One of the easiest ways of finding the latitude of a place north of the Equator is to find the *altitude* (that is, the distance above the horizon) of the Pole Star. This star is overhead at the North Pole. Take a telescope and look at the Pole Star through it. The angle made by the telescope with a horizontal line, taken by means of a spirit-level, will give the altitude of the Pole Star. This altitude is equal to the latitude of the place (see Fig. 35 A).

At the North Pole the star will be immediately overhead and, therefore, the angle through which the telescope moves

will be 90° , which is the latitude of the North Pole (see Fig. 35 A). At the Equator the Pole Star will appear close to the ground and the two lines will coincide, and, therefore, the angle is 0° , which is the latitude of the Equator.

At sea an instrument called a sextant is used for finding latitude. By means of it the altitude of the Sun and other heavenly bodies can be measured. After this altitude has been ascertained, the exact latitude of the vessel is worked out by reference to the *Nautical Almanac*, which gives the latitudes of all places where the Sun is exactly overhead for every day in the year.

Longitude

Latitude by itself would give us only the position of a place (or a ship) north or south of the Equator. For instance, if we were told that the latitude of Rio de Janeiro was 23° S. we could not fix its exact position on the globe, for it might be anywhere on this parallel of latitude. To determine its exact position we must also know its longitude. Just as in finding latitude we measure from a fixed line, the Equator, so we must have a fixed line, running due north and south, for measuring longitude. Such a line is called a *meridian*.

Longitude is distance, measured in degrees, east or west of any fixed meridian.

The Equator is divided into 360 equal parts or degrees, and on a globe lines (meridians) are drawn through these points of division to the Poles. If we look at the globe we shall see that these meridians are all equal circles, and that they cut each other at the Poles. The meridian passing through Greenwich is usually taken as the one from which measurements are calculated. This is numbered 0° . On the globe the meridians are numbered from 0° to 180° west or east, and at the Equator they are one degree, or roughly 70 miles, apart. But obviously the space between any two diminishes as they approach each other towards the Poles, where they intersect.

As the Earth takes twenty-four hours to make a complete turn on its axis, the 360 meridians of longitude take twenty-four hours to pass under the Sun. Therefore 15° pass under the Sun each hour, and 1° in 4 minutes. Because the Earth spins from *west* to *east*, places east of the meridian of Greenwich, 0° , pass under the Sun before places west of it

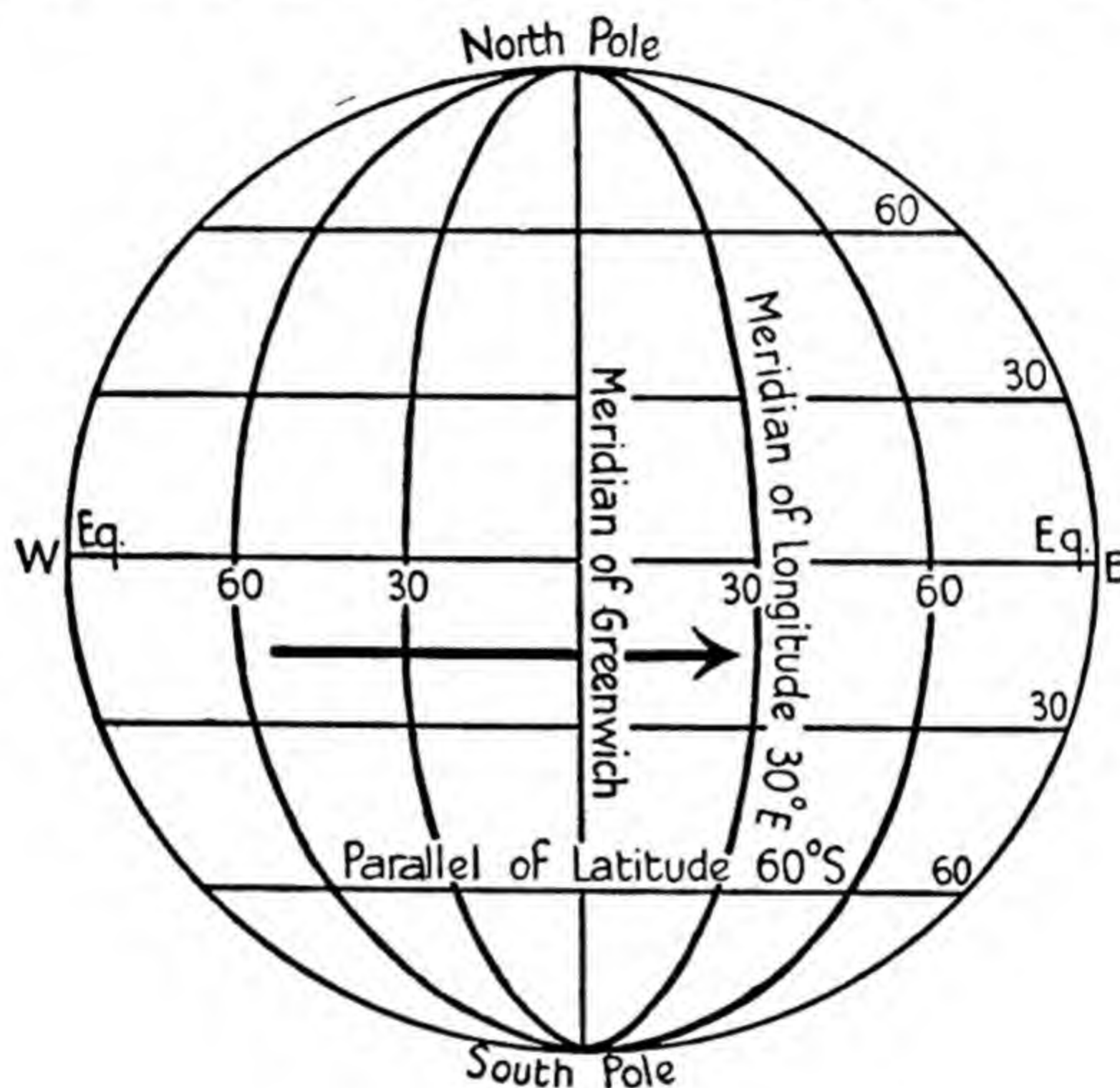


FIG. 36.

(Fig. 36). Thus, at places *east* of Greenwich it is noon *before* it is noon at Greenwich, but at places *west* of Greenwich it is noon *after* it is noon at Greenwich. When it is noon at Greenwich, at a place 1° E. it is 4 minutes past noon, that is 12.4 p.m.; while at a place 1° W. it is 4 minutes before noon, that is 11.56 a.m. Hence it is only 8 a.m. in the Falkland Islands (60° W.) when it is noon at Greenwich. But in Ceylon (80° E.) it is 5 hours 20 minutes after noon, that is 5.20 p.m.

All places on the same meridian of longitude have noon at the same time. The clocks in the British Isles, and

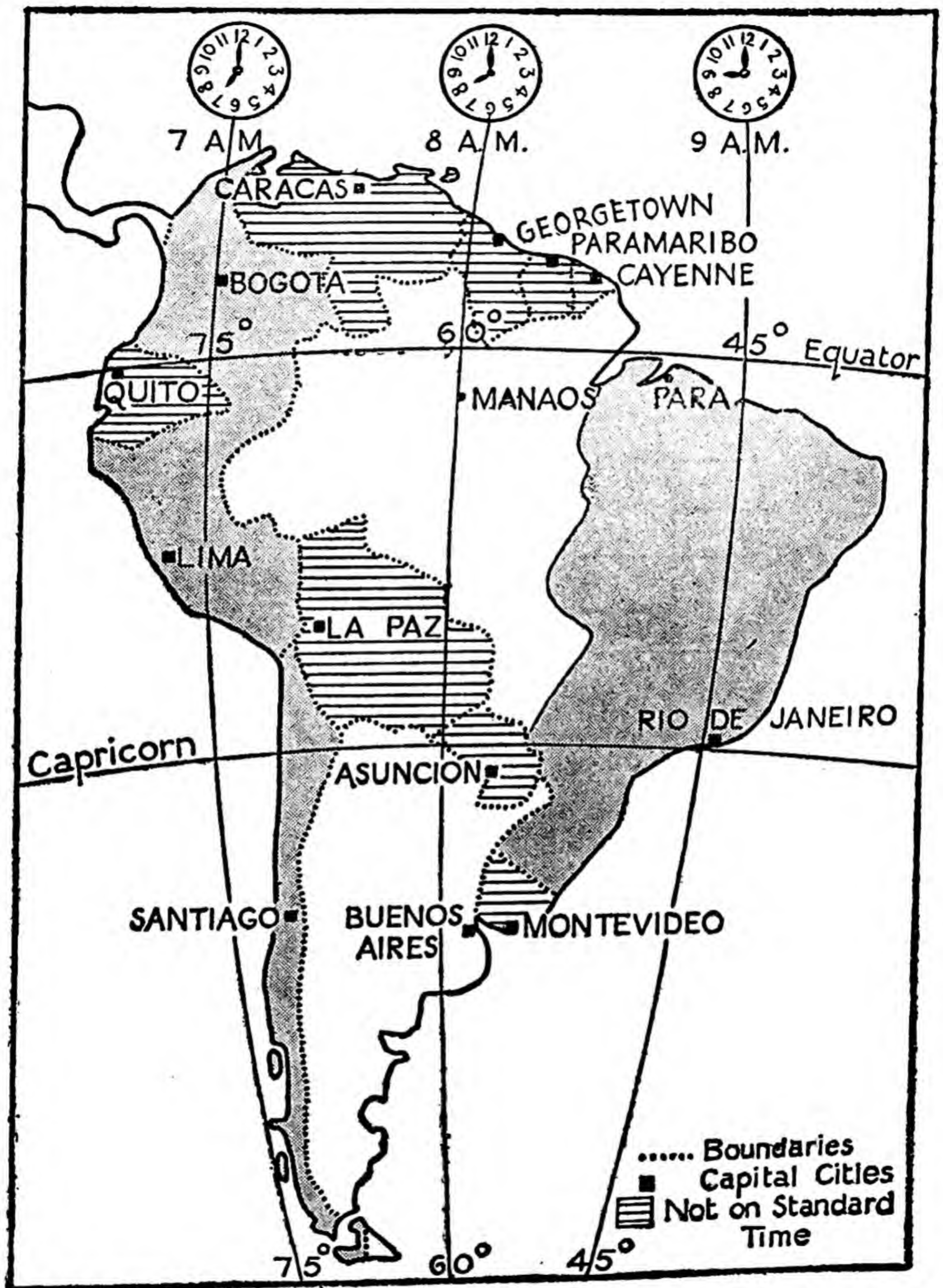


FIG. 37. Time Zones of South America (Clocks show time when noon at Greenwich).

Western Europe, are set by Greenwich time, for it would be very inconvenient if they followed local time. If, for instance, clocks at Fishguard (5° W.) were set by local time, a man travelling from London to Fishguard would find that his watch, showing Greenwich time, was 20 minutes fast when he arrived. In order to save confusion there are, in each continent, a number of Time Zones, and every place in each zone takes its time from the same standard meridian, just as we in the British Isles take our time from the meridian 0° . In South America there are three Time Zones (see Fig. 37).

When sailors wish to find their longitude, then the time when the Sun crosses the meridian, that is when the Sun is at its highest, is noted. Suppose this time is 3 p.m., as shown by the ship's chronometer which registers Greenwich time. This means that the local time is three hours *after* Greenwich noon. Therefore the longitude is *west*. The Earth has turned on its axis, since Greenwich noon, through an angle of $(3 \times 60) \div 4 = 45^{\circ}$. The longitude of the vessel is, therefore, 45° W. Nowadays, though Greenwich Mean Time (G.M.T.) can be obtained by wireless, ships still carry chronometers.

EXERCISES

1. (a) How many miles are there between the Equator and the North Pole? How many parallels of latitude? What is the approximate distance between any two parallels of latitude? Remember this distance. It forms a convenient scale for a map. (b) Find the greatest length of South America, the latitude boundaries being 11° N. and 55° S. approximately.
2. (a) Take a stick and set it upright in the ground. When the shadow cast by the stick is shortest it is midday. Mark the line on the ground. In what direction does this midday line, or *meridian*, run? (b) How can you find the direction of the North and South Poles?
3. Describe a simple method of finding the altitude of the Sun. Illustrate your answer by a diagram.

4. At 3 p.m. on Christmas Day, 1940, King George VI broadcast from England to the Empire. At what time was his speech heard by the Governor-General of Canada at Ottawa; a sugar-planter living near Georgetown (British Guiana); a British sailor whose ship was in the Indian Ocean (longitude 90° E.); a shepherd in the Falkland Islands; a merchant in Durban; and a schoolboy at Melbourne (Australia)?

5. What is the latitude and longitude of the town in which you live? What is the *local* time at your town when it is noon at Greenwich? Is lighting-up time for bicycles the same as, or before or after, Greenwich? Why?

6. The length of a degree of latitude may be used to estimate the scale of a map, but longitude, except along the Equator, cannot be so employed. Explain why this is so.

CHAPTER X

THE SEASONS

The Revolution of the Earth

BESIDES making a complete turn on its axis once every twenty-four hours, and so causing day and night, the Earth moves round the Sun. Its path, known as its *orbit*, is not

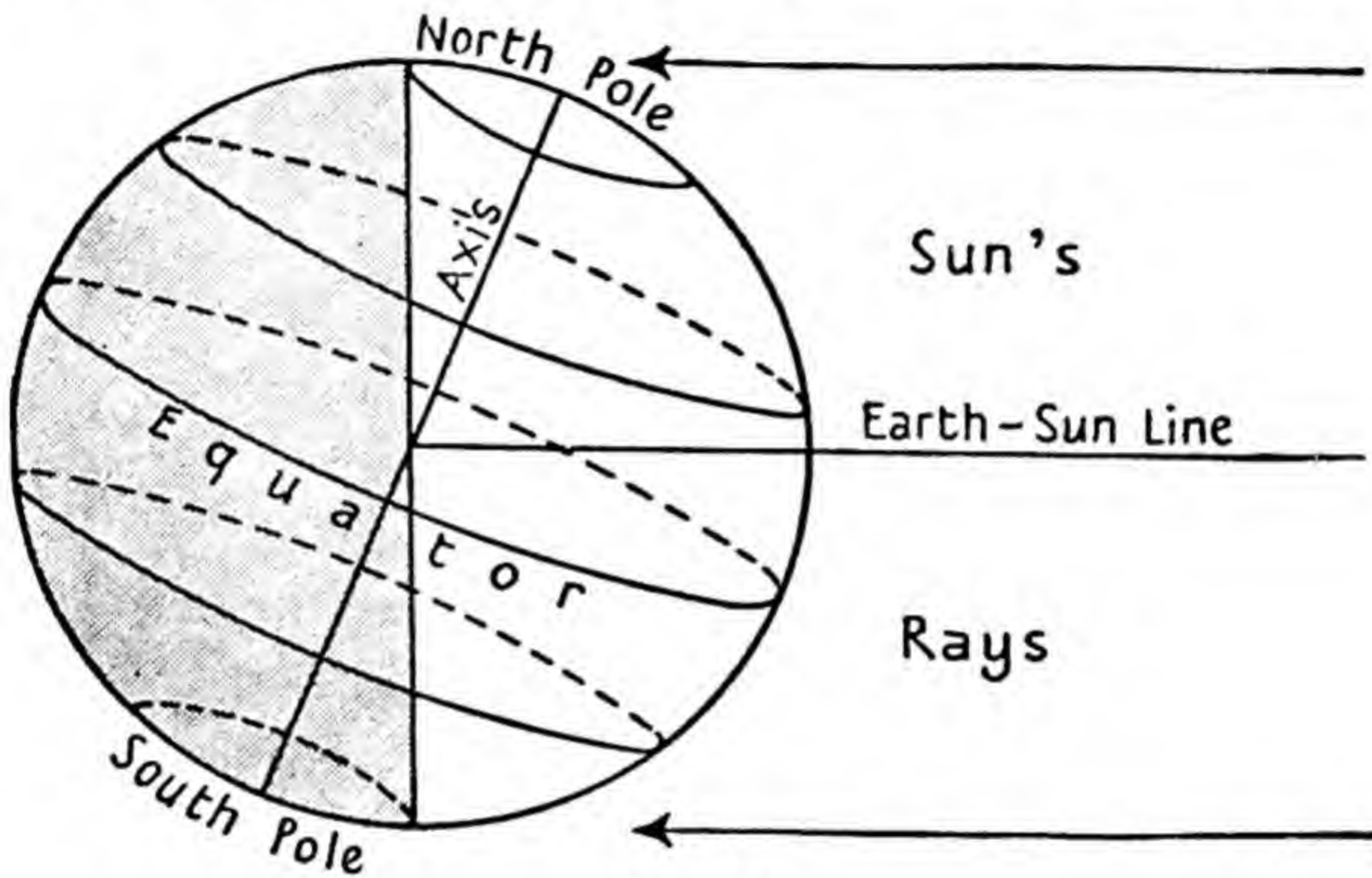


FIG. 38.

a circle, but an oval or ellipse; and the area enclosed within the orbit is known as its *plane*. The Earth takes a year (actually $365\frac{1}{4}$ days) to make a complete passage round the Sun.

The Earth's axis is not at right angles to the line which joins its centre to that of the Sun, but is inclined at an angle of $66\frac{1}{2}^{\circ}$ to that line. As the earth's axis always points in the same direction, the Northern Hemisphere is tilted towards the Sun for one-half of the year, and the Southern Hemisphere for the other half of the year. When the Northern Hemisphere is tilted towards the Sun, the North Pole has continuous daylight (Fig. 38), and the South Pole

is in darkness. When the Southern Hemisphere is tilted towards the Sun these conditions are reversed (Fig. 39).

The *seasons* are due to the changes of the Earth's position in the course of its revolution about the Sun, and to the inclination of its axis.

The Sun rises higher in the heavens in summer than in winter, and as its rays shine down more directly in summer

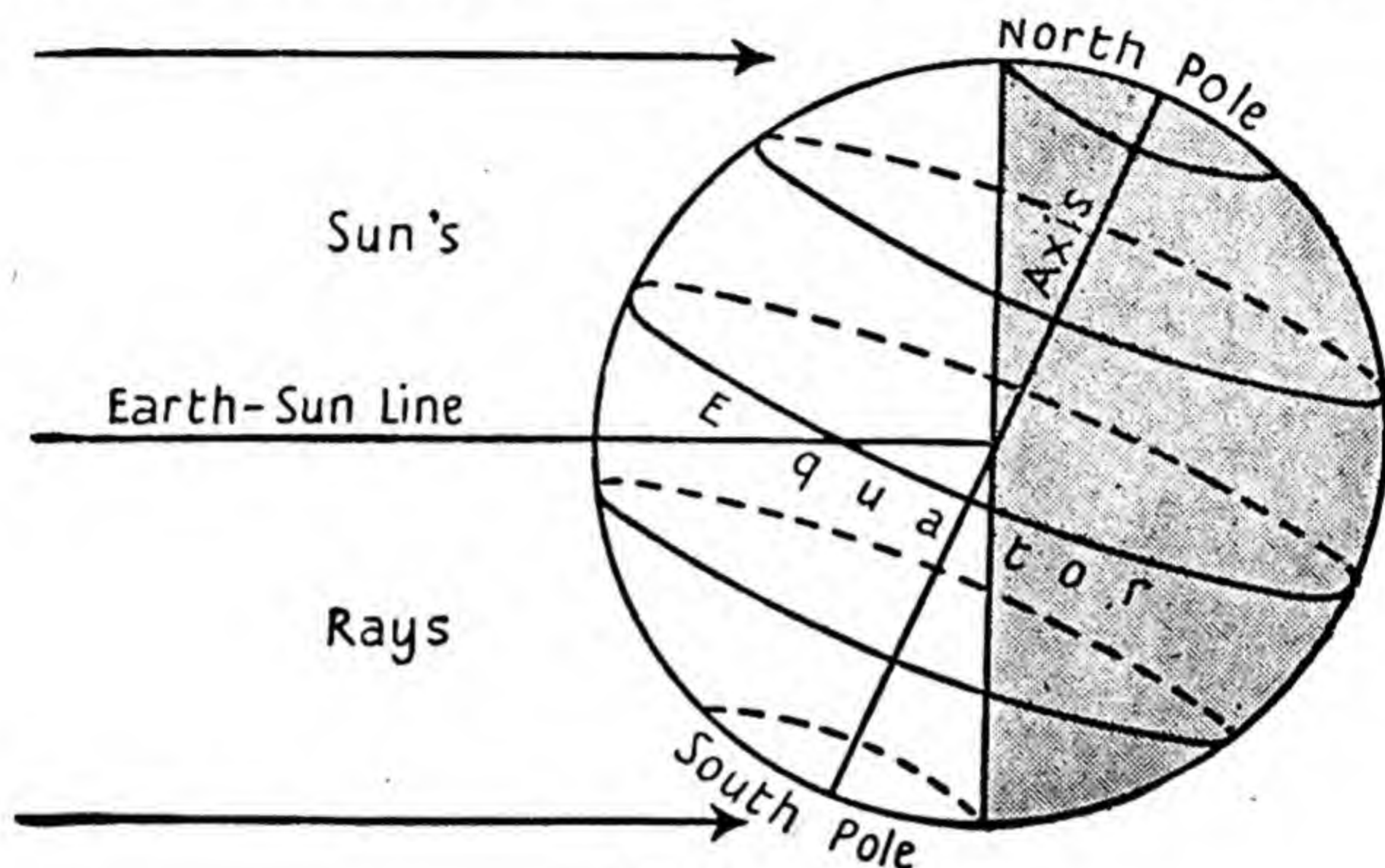


FIG. 39.

they have greater heating power. The Sun is never exactly overhead in countries like the British Isles, Uruguay, or Canada. In the Northern Hemisphere the Sun is highest in the heavens on June 21st, when the whole area within the Arctic Circle has continuous daylight for twenty-four hours. The length of the day decreases southward. On June 21st it is daylight for 16 hours 43 minutes in London; and for practically 12 hours at Quito which is almost on the Equator, but there is no daylight at the South Pole. At this time of the year it is summer in the British Isles, but winter in Argentina, Australia and other countries in the Southern Hemisphere. Similarly, December 22nd is the shortest day in the British Isles, but the longest day in Argentina, which is enjoying summer.

The Equator divides the sphere into two equal parts. Two other imaginary lines north and south of the Equator are called *tropics*, the northern being the *Tropic of Cancer*, the southern the *Tropic of Capricorn* (Fig. 40). The word *tropic* means 'turning-place'. At one time men thought that the Sun turned south on June 21st and north on December 22nd. Because the Sun stops its apparent northward

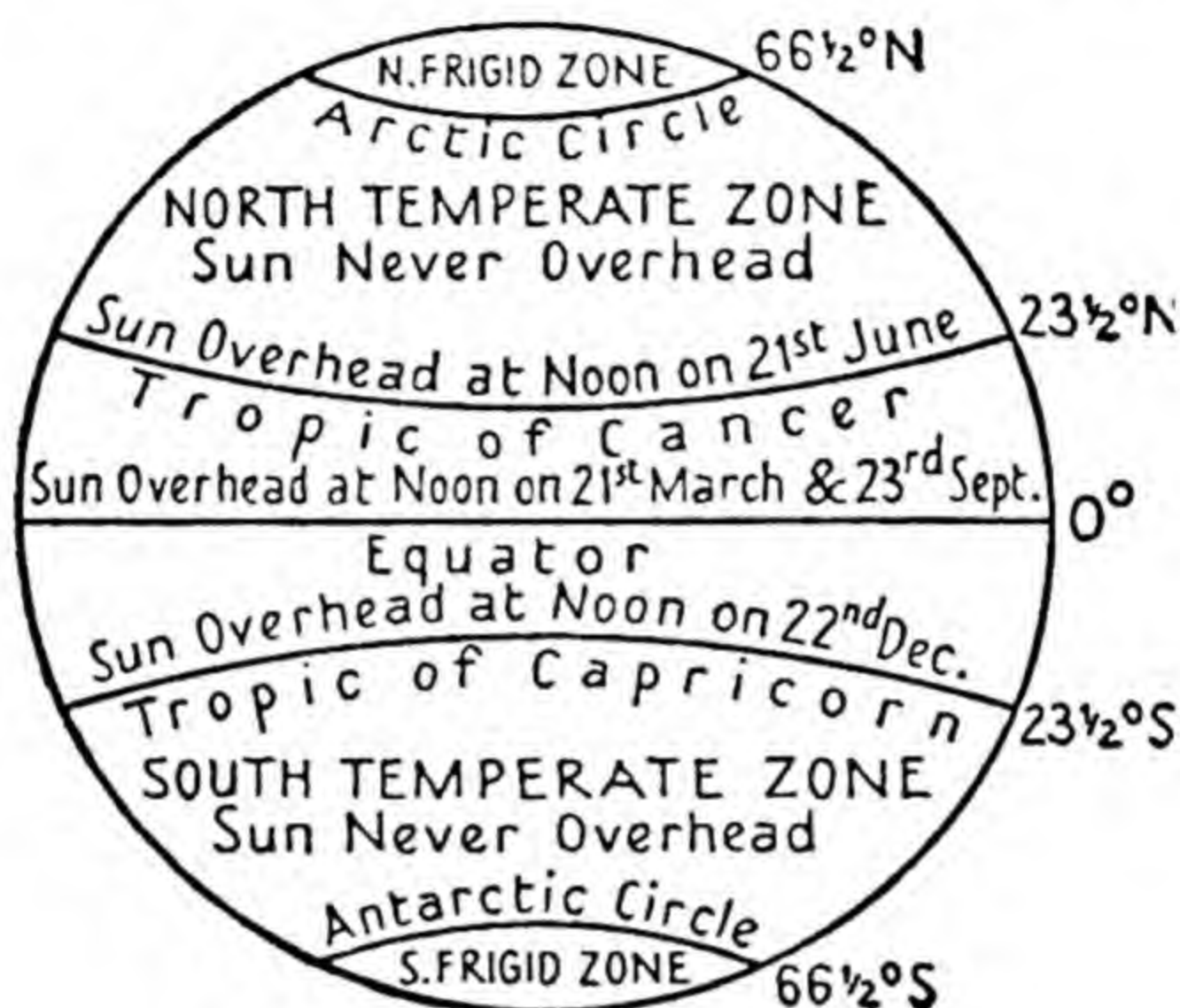


FIG. 40.

and southward movements on June 21st and December 22nd these dates are called *solstices* (from a Latin word *solstitium*, meaning 'the standing still of the sun'). June 21st is known as the *Summer Solstice* and December 22nd as the *Winter Solstice*. On June 21st the Sun is overhead at noon at all places on the Tropic of Cancer. On December 22nd it is overhead at all places on the Tropic of Capricorn.

The Sun is overhead at the Equator on March 21st and September 23rd. These dates are called *equinoxes*, a word meaning 'equal nights'. At the equinoxes the Sun rises exactly in the east and sets exactly in the west at all places on the Earth's surface, and days and nights are equal all over the world (except at the Poles). March is spring in the British Isles, but in Uruguay or New Zealand it is autumn.

At the Equator days and nights are equal throughout the year. The Sun always rises and sets at the same time. There is practically no twilight and at 6 p.m. it is just as if the Sun were suddenly extinguished. Throughout the tropics, as the region between the Tropic of Cancer and the Tropic of Capricorn is called, there is little variation in the length of day and night.

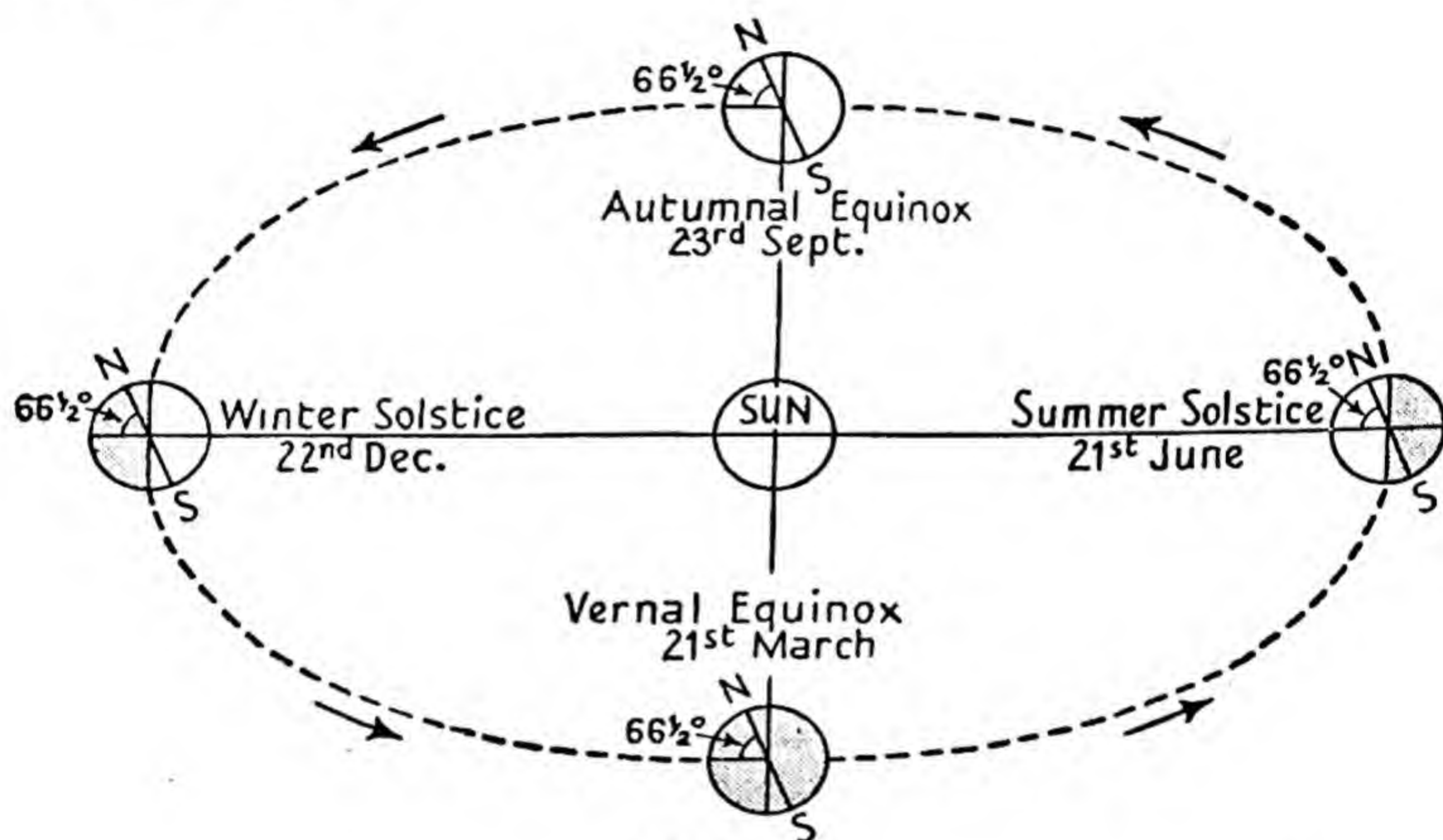
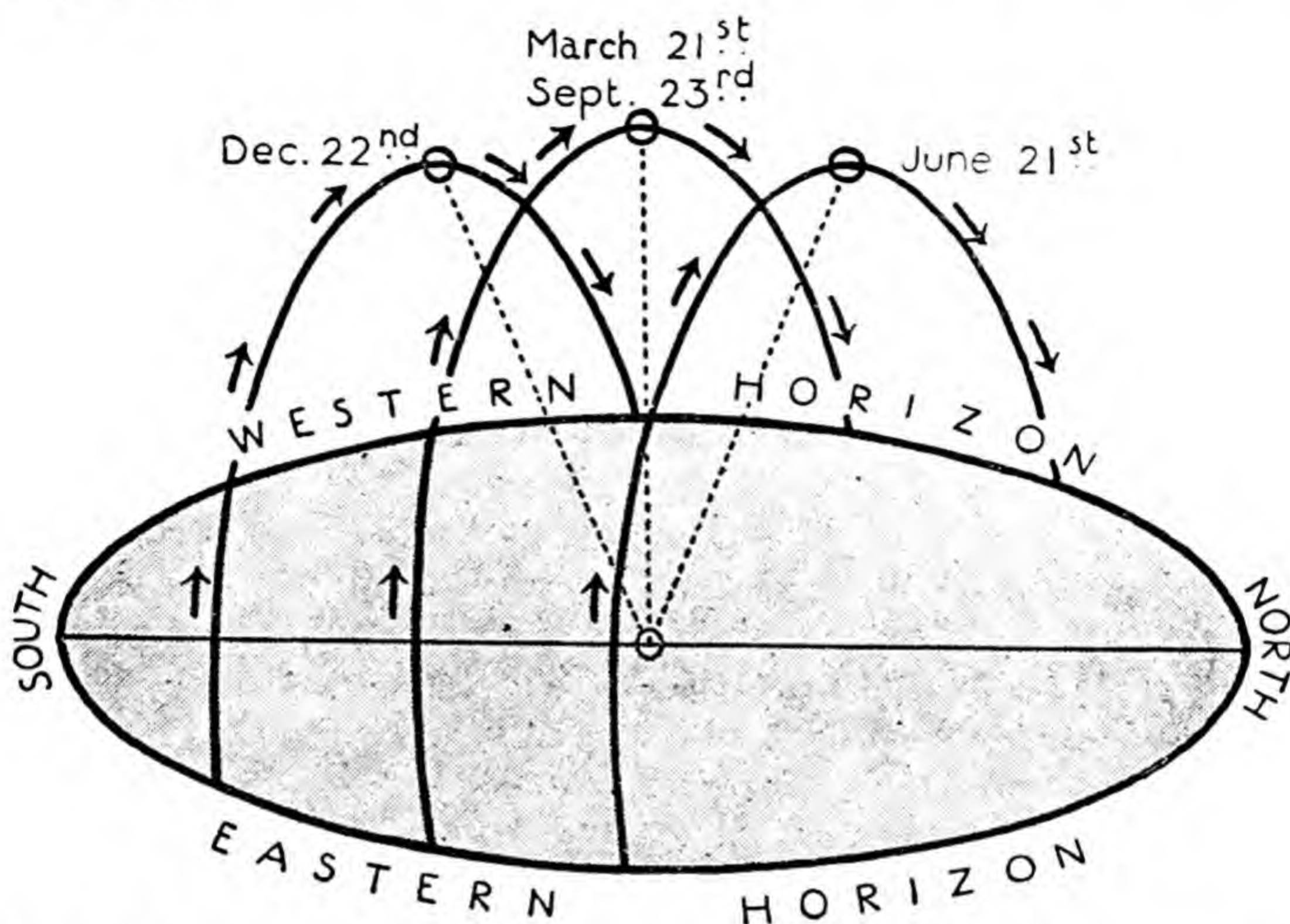


FIG. 41.

At the North Pole there is continuous daylight from March 21st to September 23rd. The Sun does not rise or set but circles round and round in the sky. There are some weeks' twilight before March 21st and after September 23rd. But though the Sun shines down on the North Pole for six months, its rays are so indirect that even in midsummer they have as little heating power as in the British Isles at the end of January.

From March 21st until June 21st the days lengthen in the Northern Hemisphere. From June 21st until September 23rd their length decreases, but they are still longer than the days in the Southern Hemisphere. From Septem-

ber 23rd the days lengthen in the Southern Hemisphere, but continue to grow shorter in the Northern Hemisphere until December 22nd, after which they begin gradually to lengthen.



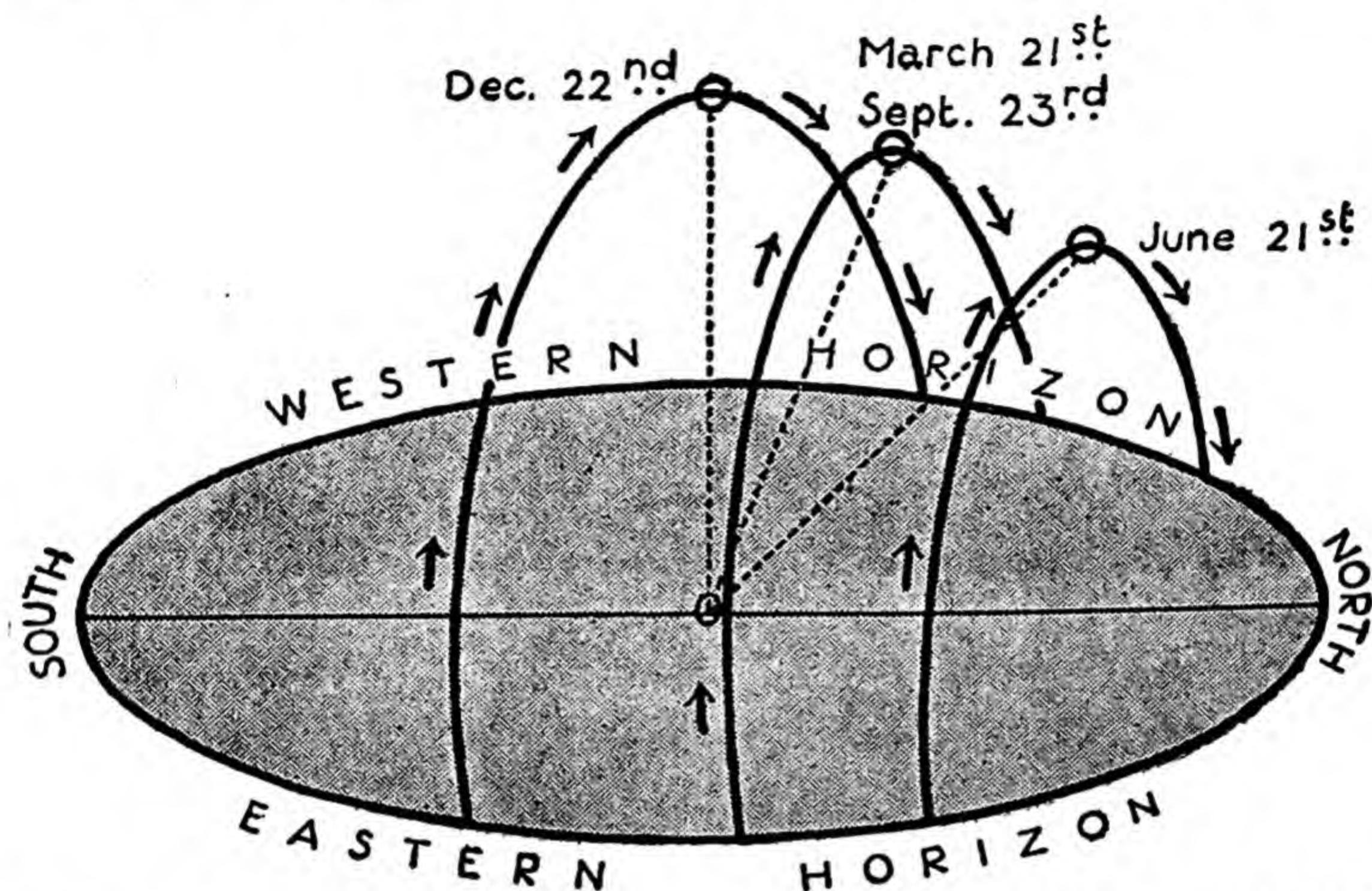
Paths of Sun as seen at Equator (Para) by Observer at O

FIG. 42. Path of the Sun at Para.

The Path of the Sun

Fig. 42 shows the path of the Sun at Para, almost on the Equator, on March 21st, June 21st, September 23rd, and December 22nd. On March 21st the Sun rises in the east, climbs higher and higher in the sky until midday, when it reaches its zenith. It then descends and sets in the west. Each day until June 21st the Sun rises a little more to the north-east, but does not climb quite so high in the sky, and sets a little more to the north-west. On June 21st the Sun rises towards the north-east and sets towards the

north-west. From June 21st onwards the Sun climbs higher in the sky at noon, until on September 23rd its path is the same as on March 21st. From September 23rd till December 22nd it rises a little more to the south-east, sets a little more to the south-west, and does not climb



Paths of Sun as seen by Observer O at Tropic of Capricorn (Rio)

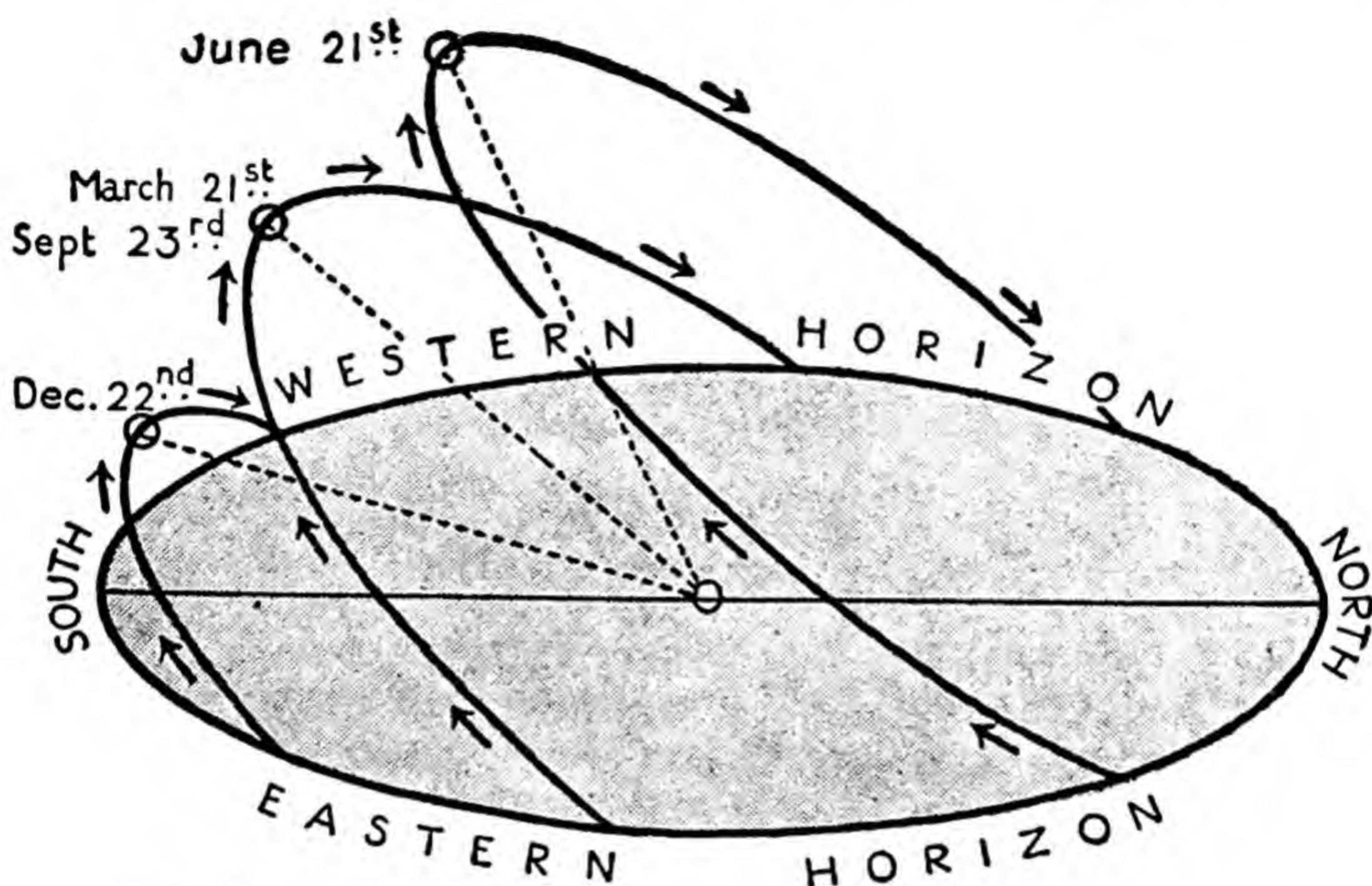
FIG. 43. Path of the Sun at Rio.

quite so high in the sky each day. From December 22nd onwards it gradually returns to its position on March 21st, reaching each day a slightly higher point in the heavens at noon.

In the equatorial belt, as we have seen in the Amazon lowlands, there are no seasons as there are in countries like the British Isles; for the Sun is always more or less overhead and it is hot and wet throughout the year. In the savannas, to the north and south, there are two seasons—a rainy season in summer when the Sun is overhead, followed by

a cool dry season, as the Sun moves north or south as the case may be.

Fig. 44 shows the paths of the Sun, at the four seasons, as seen in England. On March 21st the Sun rises in the east at 6 a.m., climbs higher in the sky until midday, and then



Paths of Sun as seen by Observer O at London

FIG. 44. Path of the Sun at London.

descends, setting in the west at 6 p.m. Each day until June 21st the Sun rises a little more to the north-east, climbs higher in the sky, and sets a little more to the north-west. On June 21st it rises in the north-east just before 4 a.m. and sets in the north-west about 8.30 p.m. From June 21st onwards it rises a little later, sets a little earlier, and does not climb quite so high in the sky each day, until on September 23rd its path is the same as on March 21st. It continues to rise later and set earlier until December 23rd, when it rises about 8 a.m. in the south-east, and sets about 4 p.m. in the south-west. In summer, as the Sun is not only

higher in the sky, but is above the horizon for almost double the time it is in winter, its heating power is much greater than in the latter season when it is low in the heavens.

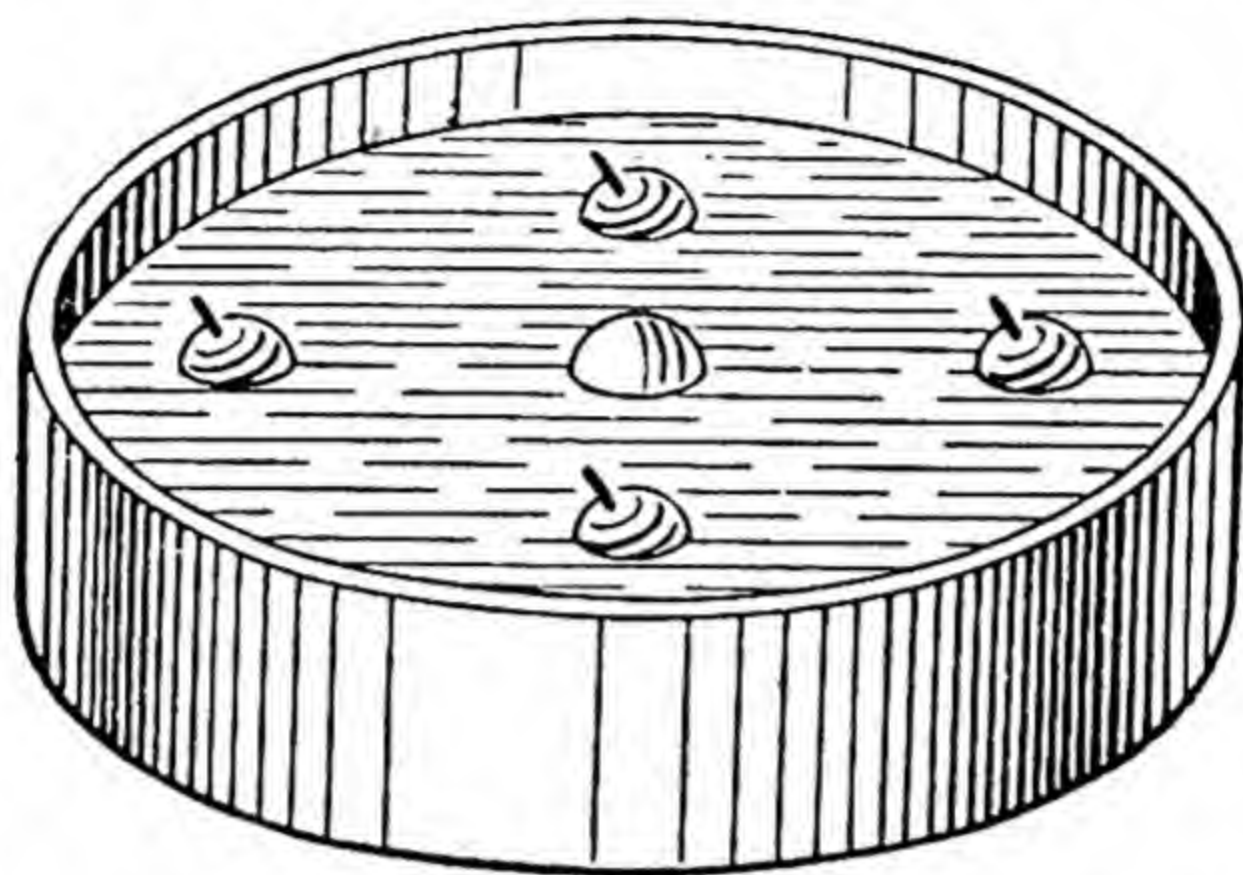


FIG. 45A. Diagram to illustrate the revolution of the earth about the sun.

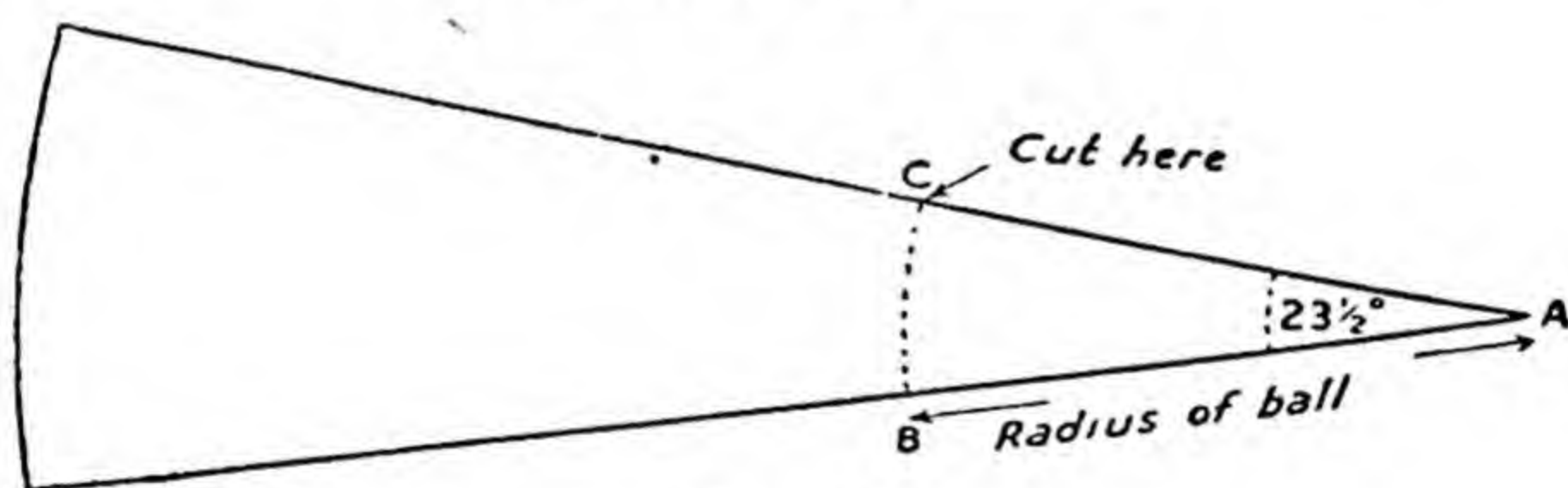


FIG. 45B.

EXERCISES

1. (a) Name one region in South America where (i) there are four seasons, (ii) two seasons, and (iii) where the climate is practically the same throughout the year. (b) Draw a diagram to show why the Sun's rays have greater heating power at Rio de Janeiro than they have at Buenos Aires.

2. (a) On what dates does the Sun rise exactly in the east and set exactly in the west at all places on the Earth's surface? (b) Find the following places in your atlas. State on what date, or dates, if any, the Sun is exactly overhead at noon: Quito, Rio de Janeiro, London, New York, Havana. (c) On what date, or dates, at your school is the Sun longest above the horizon? (d) At which of the following places, on June 21st at midday, is the shadow cast by a person longest: Santiago, London, Bombay?

3. Draw a diagram to show the path of the Sun, as seen at Port Stanley, Falkland Islands ($51^{\circ} 45' \text{ S.}$) on June 21st. What season is this in the Falkland Islands? In what direction would the shadow of a man at Port Stanley point at noon?

4. Take an oval dish filled with water. Fix in the centre a large ball to represent the Sun. Now take a smaller ball (a hollow rubber ball will do) to represent the earth. Float this ball, and when it comes to rest, mark the points of its *vertical* axis. Through these points draw a circle round the ball, and on this circle mark off from each point an arc subtending an angle of $66\frac{1}{2}^{\circ}$ at the centre, at the top on the left, at the bottom on the right. Thrust a knitting-needle through the ball, joining the ends of these arcs, in such a way that an equal length of the needle projects from the ball. If the ball is now again floated, it will be found that the needle is inclined at an angle to the surface of the water, in the same way that the Earth's axis is inclined to the plane of its orbit. The ball may then be set moving round the edge of the dish (see Fig. 45A).

Other circles may be drawn round the ball to represent the Equator and the parallels of latitude indicating the tropics ($30^{\circ} \text{ N. and S., and } 60^{\circ} \text{ N. and S.}$).

This is most conveniently done by means of a *template*. First find the diameter of the ball (this can be done by placing the ball between two parallel wooden blocks so that it just touches them and then measuring the space between the blocks). Then take a thin piece of cardboard and cut out an angle of $23\frac{1}{2}^{\circ}$ ($90^{\circ} - 66\frac{1}{2}^{\circ}$). With the point *A* (see Fig. 45B) as centre and the *radius* of the ball as radius, mark off the arc *BC*. Cut the card along the arc *BC*, and when the figure *ABC* is removed it will be found that the curved end of the card that is left exactly fits on to the ball.

5. Describe the path of the Sun at Rio de Janeiro on March 21st, June 21st, September 23rd, and December 22nd (see Fig. 43).

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· AFRICA

CHAPTER I

THE AWAKENING OF AFRICA

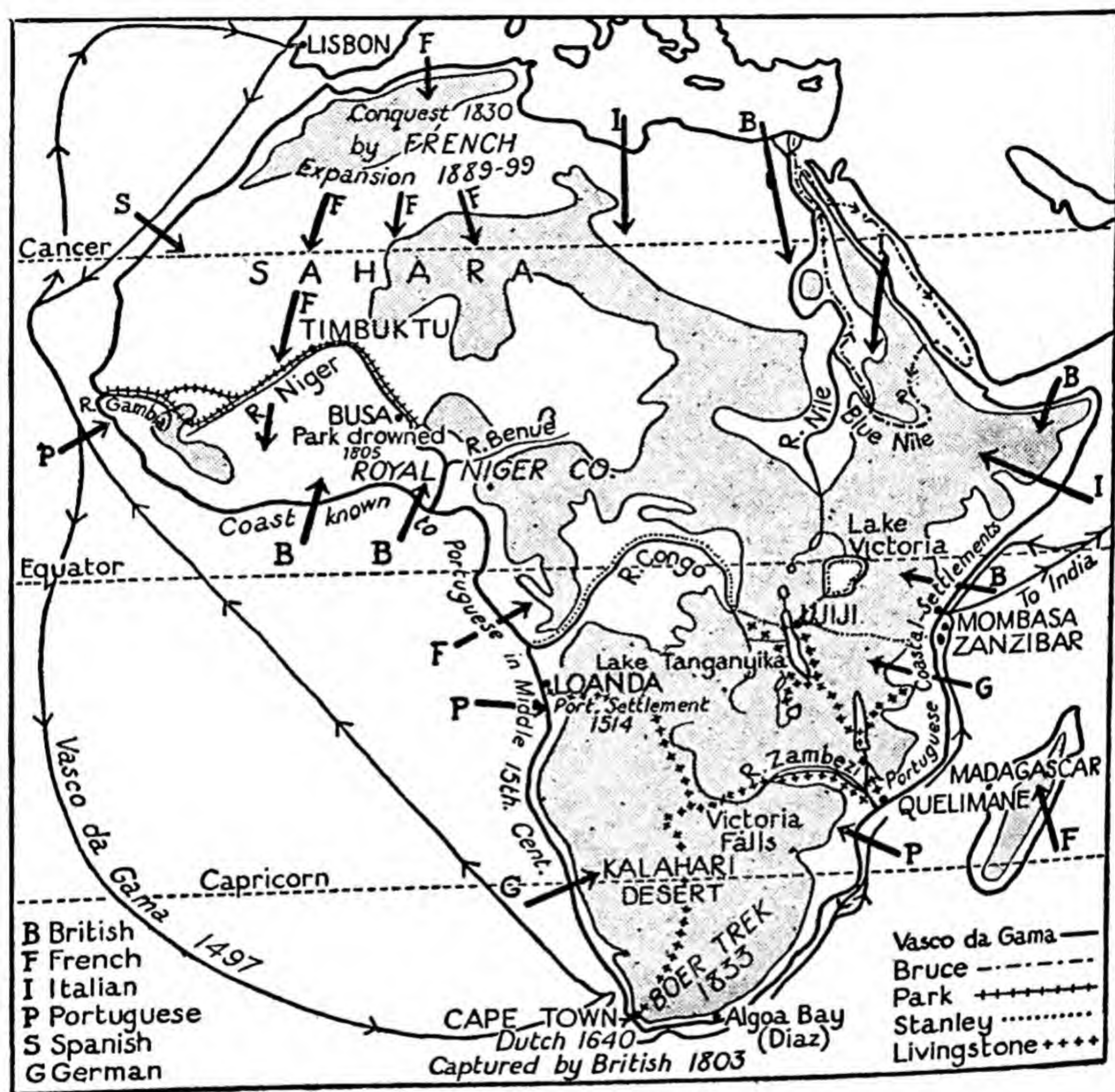
The 'Dark Continent'

It has been aptly said that for centuries the white man nibbled at Africa without success, for only in the north did he manage to get a good bite until a century or so ago, and then he attempted to swallow the whole continent. To-day in many parts of Africa civilization has only just begun. It seems strange that, apart from Egypt and the lands along the Mediterranean littoral, most of Africa was almost unknown to Europeans until recent times; for the continent lies at the very doors of Europe and Asia; it is joined to the latter by the Isthmus of Suez, and from the former it is separated only by the narrow Strait of Gibraltar. Even America had been discovered and partly settled by white men while Africa remained the 'Dark Continent'. Why was it that Africa so long remained a land of mystery, its mighty deserts almost uncrossed, its vast forests unexplored, its great rivers unnavigated? The answer lies mainly in the geographical conditions: in the physical features, climate, and vegetation.

About three-quarters of Africa lies within the tropics: in no other continent is so great an area situated within these latitudes. The hot climate does not encourage people to be energetic: their needs are few and easily satisfied, and there is not the incentive to work that there is in temperate lands. Moreover, much of Equatorial Africa is unhealthy even for Africans, and quite unsuited for permanent settlement by white people.

The regular coast-line, with its lack of good harbours, proved a great handicap to the opening up of Africa. In

addition, owing to its immense size—it covers one-fifth of the land surface of the globe—vast areas lie far from the ocean. Long stretches of coast are bordered by inhospit-



able deserts; others are margined by hot, wet, unhealthy forests which extend for hundreds of miles, and, in the case of the Congo region, for a thousand miles, or more, inland. Another obstacle to exploration lies in the fact that the narrow coast-lands are nearly everywhere bordered by

steep escarpments, that form a rim around the plateau of which the greater part of Africa is composed. Even the rivers hinder rather than aid penetration, for in their lower courses, where they fall over the edge of the plateau, they are impeded by rapids which prevent ocean-going vessels from travelling far up-stream. Only on the Nile are such rapids far from the sea.

Let us glance back to the lands along the Mediterranean seaboard of Africa, those lands which alone in this huge continent have for thousands of years been the homes of cultured peoples, such as the Egyptians; and which were settled by Phoenicians, Greeks, Romans, and Arabs, all of whom left their mark along the coastal fringe. It is the Sahara, rather than the Mediterranean, that forms the real division between Europe and Africa; for this enormous desert is a barrier between the peoples on either side, while the great sea is a link between them.

In Ancient Egypt

The dry atmosphere of Egypt has helped to preserve temples, and tombs like the Great Pyramids; age-old monuments such as the Great Sphinx; and other ancient buildings, all of which tell of people who were civilized thousands of years before the time of Christ. The ancient Egyptians regarded the Nile as a sacred river. To them it was a source of life, for without its waters and wonderful floods, which made irrigation possible, their land would have been a desert, part of the Sahara. Even their words for north and south meant 'up-stream' and 'down-stream'. In order that they might know when to expect the Nile floods they invented a calendar; and as long ago as 4241 B.C., the earliest date that archaeologists have been able to fix, the Egyptians had divided their year into 365 days. Safe in their fertile valley, protected on the east and west by the desert, on the south by unknown lands, and on the north by the marshy delta through which the Nile flowed into

the Mediterranean, they developed their wonderful culture. They were skilful farmers, irrigating their lands from the great river; clever craftsmen, working in metals, fashioning pottery, spinning, weaving, and dyeing cotton and flax, and making the materials into clothes. They built great cities. They had a knowledge of mathematics. They produced the first written documents. These were inscribed on papyrus (from which we derive our word *paper*), made by splitting the reeds growing by the Nile and pasting the edges together to form one long sheet; their ink consisted of soot mixed with gum, and their pens of pieces of pointed reed.

It was from the Nile, and the Tigris-Euphrates valley, that Europe received her first lessons in the arts and crafts of civilized life. The stream of civilization passed from North Africa, South-West Asia, and Crete, across the Aegean Sea to Greece and Rome, thence to Western Europe, and in modern times to the New World.

The Phoenicians

Greatest of the sea-faring folk of olden times were the Phoenicians, who lived along the coastal strip of Syria which was backed by the forested mountains of Lebanon. This palm-fringed shore, fronting the blue waters of the Mediterranean, was an ideal home for these merchant-traders who sailed throughout the almost land-locked sea, and passing through the Pillars of Hercules (now Gibraltar and Ceuta) ventured into the Atlantic. Carthage, their famous colony on the north coast of Africa, guarded the sea-gate between Sicily and Tunis, leading from the Western to the Eastern Basin of the Mediterranean.

About 600 B.C. a party of Phoenicians sailed round Africa from the Red Sea to the Mediterranean. Their galleys had both sails and oars, the latter being arranged in two or three banks. Each oar was manned by some six slaves, who were chained to it and kept at work by the lash of the overseer.

Is it not remarkable that under such conditions Africa was almost circumnavigated?

Hanno, a famous Carthaginian sailor, about 470 B.C., made his way along the west coast of Africa. Passing the desert shores of the Sahara he reached the forested mouth of the Senegal, where he saw fierce gorillas, huge crocodiles, and other strange animals. He tried to establish settlements, but finding this impossible carried back such unfavourable reports of the country that no further attempts were made to explore that part of Africa until the fifteenth century.

The Arabs

In A.D. 641 the Arabs invaded Egypt, and one section, the Berbers, overran Morocco, where their descendants live to this day. From their home in south-west Asia other Arabs sailed across the Indian Ocean to East Africa, seeking slaves and ivory, which they obtained from the tusks of animals. Those negroes who were able to escape their clutches took refuge on the grasslands of the interior or in the depths of the Congo forests. Wherever they went the Arabs introduced slavery, but they also spread Islam, based on the teaching of their great prophet, Mohammed, and so brought some degree of culture to the negro peoples. The chief Arab slave-markets were Zanzibar and Pemba, many of whose present inhabitants, like those along the adjacent coast-lands of East Africa, are descended from Arab slave-dealers and their negro wives.

The Portuguese

Early in the fifteenth century the Portuguese started their attempts to find a sea-route to India, for as the Turks held Egypt and the Mediterranean coasts of Asia they controlled the European trade with that continent. The Portuguese were fortunate in their ruler, Henry the Navigator, who established an observatory at Cape St. Vincent and engaged the foremost scientists and navigators of the day to train

his seamen. Gradually the Portuguese made their way along the west coast of Africa. In 1420 Madeira was reached; twenty-four years later Cape Verde; in 1484 Portuguese ships anchored in the estuary of the Congo, but owing to the rapids they did not go far inland, but sailed farther south and landed on the shores of what is now their possession of Angola. One of their most noted seamen was Bartholomew Diaz, who rounded the south-east of Africa and landed at Algoa Bay. But owing to signs of mutiny among his men he decided to return, and passing round Cabo Tormentoso, or the Cape of Storms, he eventually reached home. The King of Portugal was greatly impressed by the accounts Diaz gave of his voyage, but he decided to change the name of the Cape of Storms to the Cape of Good Hope, for he thought that the route round the southern end of Africa showed promise of being the sea-way to India.

Inspired by the example of Diaz, Vasco da Gama set out, in 1497, in command of four small ships. After four and a half months he reached the Cape. On Christmas Day he discovered Natal, which he named after the birthday of Christ. Pursuing his way along the east coast he arrived at Mombasa whence he sailed for India, and thus showed that it was actually possible to reach that country by voyaging round the south of Africa.

For a long time the scattered Portuguese settlements along the coasts of Africa were used merely as ports of call on the way to India, and for trading purposes to obtain slaves, gold, and ivory. Thus, although the outline of Africa was known by the end of the fifteenth century, its vast interior still remained wrapt in mystery.

Dutch Settlers

In 1652 the Dutch East India Company established a settlement at the Cape of Good Hope, but the colony was not well ruled, and by the end of the eighteenth century

was almost bankrupt. Early in the nineteenth century the Dutch ceded the Cape to the British, who were anxious to acquire it as a half-way house on the sea-route to India. From 1820 British colonists settled round Port Elizabeth and Grahamstown in the south-west, and Durban, in Natal.

There were frequent disputes between the British and Dutch, and the latter determined to leave the Cape and seek fresh lands farther afield. So they set out on their famous and heroic trek. With great difficulty they made their way up the steep escarpments to the plateau beyond. Day after day their covered wagons, drawn by yokes of stalwart oxen, lumbered across the wide wind-swept veld, in some places almost impassable owing to belts of thorny scrub, and in others because of deep, rock-strewn watercourses, which after heavy rain were quite unfordable. Beside the wagons rode the sturdy Boer farmers on horseback, their rifles slung over their shoulders, always on the alert for hostile tribes of natives; while inside sat their wives and children amidst the household goods, often their sole possessions.

At last these pioneers forded the Orange River. In the region beyond some settled and founded the Orange Free State; but others went still farther north, and crossing the river Vaal established the Transvaal.

There were various wars between the British and Dutch, but in 1902 the Transvaal and the Orange Free State came under British rule, and in 1910 Cape Colony and Natal and the two Boer states were united to form the Union of South Africa.

Modern Exploration

Of the famous men connected with the exploration of Africa three Scotsmen—Bruce, Park, and Livingstone—were outstanding. In the latter part of the eighteenth century James Bruce discovered the source of the Blue

Nile and followed the river to its confluence with the White Nile.

Mungo Park, a young surgeon in the service of the African Association, did much to explore the Niger. In his last journey his boat was wrecked at the Bussa rapids. He was attacked by hostile natives and jumping into the river with his three surviving companions was drowned. Park had collected more information than any preceding explorers, and had ascertained that the Niger flowed direct into the sea and was not, as had been supposed, a tributary of the Congo.

Greatest of the African explorers was *David Livingstone*, a medical missionary who arrived at the Cape in 1841. During his thirty years' work his travels extended from the Cape to the Equator, and from the Indian Ocean to the Atlantic. Soon after his arrival in Africa he was sent north to establish a mission-station in Bechuanaland, where for a time he lived among the natives, learning their language and customs. The year 1846 saw Livingstone in the Transvaal, where he taught the people how to irrigate their land. In 1849 he crossed the north-east border of the Kalahari Desert and discovered Lake Ngami. Two years later Livingstone reached the Zambezi, and thence, after great hardships, journeyed to Loanda on the west coast, somewhat south of the mouth of the Congo. On his return journey he discovered the Victoria Falls, and then travelled down the Zambezi to Quilimane on the Indian Ocean, having thus crossed Africa from coast to coast.

During his subsequent journeys Livingstone made his way up the Shiré to Lake Nyasa. It was at this lake in 1866 that he was deserted by many of his followers, who returned to Zanzibar and reported that he had been killed by Zulus. But the undaunted explorer pressed on into the heart of Africa. In his journal he tells us how he took his belt up three holes to relieve his hunger, when owing to the loss of his goats he was reduced to living on maize. Other disasters

befell him. His medicine chest was stolen; more porters left him; but through dripping forests and oozing bogs he struggled until he reached Lake Tanganyika, and then travelling south discovered Lake Bangweulu, where most of his remaining followers departed. Worn out and ill from the many hardships he had undergone, Livingstone was carried in a litter to Ujiji, on the eastern shore of Lake Tanganyika, where to his dismay he found that the stores he had left there had been sold.

A relief expedition under the command of Henry Morton Stanley had been sent to Africa to discover the truth about Livingstone. Leaving Zanzibar, Stanley journeyed inland, and guided by reports that there was a white man at Ujiji he made all possible speed and reached the village on October 28th, 1871. The two men spent some time exploring the north end of Lake Tanganyika. Then Stanley tried to persuade his companion to return home with him, but Livingstone refused to leave the land in which he had toiled so long, and Stanley set out for Zanzibar without him, carrying the welcome news that the intrepid explorer was still alive though in bad health. Meanwhile porters were sent to the sick explorer, who made his way to Lake Bangweulu, travelling through swamps infested with stinging ants and poisonous spiders. Worn out by fever and hunger he was carried by two faithful natives from village to village. Day after day, bearing their beloved master, they toiled on through the marshy forests. But on the morning of May 1st, 1873, when they went to wake him, they found Livingstone dead, kneeling by his bedside. His followers embalmed his body as best they could, and wrapping it in sailcloth carried it half-way across Africa to the east coast. From Zanzibar the remains of the great Scotsman were conveyed to England, where they were buried in Westminster Abbey.

Of the great explorer Stanley writes: 'In the annals of exploration of the "Dark Continent" we look in vain among

other nationalities for such a name as Livingstone's. He stands pre-eminent above all; he unites in himself all the best qualities of other explorers. . . . Britain excelled herself when she produced the strong and perseverant Scotsman, Livingstone.'

Great as was Livingstone's work of exploration, his crowning achievement was that he brought about the end of the slave-trade. Fully he carried out his motto: 'Fear God and work hard.'

Stanley's Later Work. Stanley went back to Africa and during his journeys discovered the principal source of the Nile; explored Victoria Nyanza, Lake Tanganyika, and Albert Nyanza; and by discovering that the Lualaba was the headstream of the Congo proved that there was a great waterway leading into the very heart of tropical Africa.

Failing to arouse the interest of British merchants in his discoveries, Stanley enlisted the aid of Leopold II of Belgium, who established a chain of trading stations along the banks of the Congo and obtained control of the High Katanga district, rich in minerals and, owing to its elevation, one of the few parts of the basin suited to European settlement. Considerable portions of the Congo region were secured by France and Portugal, but most of it ultimately became the Belgian possession of the Congo Free State.

Africa To-day

We have seen something of the part played by the Portuguese, British, Dutch, and Belgians in the opening up of Africa, but French, Germans, Austrians, Italians, and Spaniards have all shared in making the 'Dark Continent' known, and so paved the way for its colonization by European powers. To-day a belt of territory, stretching from the Anglo-Egyptian Sudan to the Cape, forms part of the British Empire, as do Nigeria and other colonies in West Africa. The French rule most of Northern Africa,

where their possessions extend from Northern Africa to West Africa and the Congo, and also include the island of Madagascar and French Somaliland. The Belgians own the greater part of the Congo Basin; the Portuguese the adjacent state of Angola as well as Mozambique in East Africa. The Italians claim Libya, and Italian East Africa, which includes Eritrea, Abyssinia, and Italian Somaliland. The only two independent native states are Egypt and the negro Republic of Liberia.

Thus mainly under the guidance of Europeans, or people of European descent, Africa is being developed and her backward races are becoming civilized. Roads and railways are being built and fresh air routes opened up. Doctors and scientists are working to improve conditions in unhealthy areas; missionaries and teachers are educating the people; traders and trading companies are extending their operations in many directions. Africa, once the 'Dark Continent', is slowly yielding her treasures for the benefit of the world at large. And these treasures are many and varied. Not only does the continent produce minerals, especially gold and copper, but also commodities such as palm oil, cacao, copra, and cotton, all of which are greatly in demand by manufacturers in the industrial countries of the temperate zone.

The Peoples of Africa

There are as many differences between the various peoples of Africa as there are between those living in Europe. South of the Sahara most of the native Africans are of negro blood. Northern Africa is inhabited mainly by Hamites, who belong to the south Mediterranean branch of the white race. The Berbers of the Atlas lands, the Tuaregs who roam over the Sahara, the peasants of Egypt, and the Masai herdsmen of Kenya are all of Hamitic stock.

On the southern margin of the Sahara, where the desert merges into the savannas of the Sudan, and Hamites and

negroes meet, there has been much intermarriage; and the Hausas and Fulani of Northern Nigeria, and other peoples, are mixed races who are lighter skinned than pure-blooded negroes.

The typical negro is very dark, with woolly hair and of fine stature, but some are lighter than others. The Sudanese negroes, who, as their name implies, are found in the Sudan, and the negroes of West Africa, are usually very dark brown, with thick lips, and broad flat noses. The Bantu, numbering some forty million, who inhabit Africa south of the Sudan, are as a rule lighter in colour than the Sudanese, and their noses are less broad and flat.

The pygmies who live in the depths of the Congo forests are supposed to be akin to those other primitive people the Bushmen, who dwell in the Kalahari Desert. The latter have yellowish-brown skins, bulging foreheads, prominent cheek-bones, and hair growing in tangled patches. Their neighbours the Hottentots, a mixed race with some Bushman blood, are more advanced, being herdsmen as well as hunters and collectors.

The native Africans are at all stages of civilization, ranging from the Egyptians down to the primitive pygmies. The pygmies and the Bushmen are collectors and hunters; the Fulani who live on the savannas are herdsmen. Many tribes combine herding with primitive agriculture; but others, such as the cocoa-farmers of the Gold Coast and the cotton-cultivators of the Anglo-Egyptian Sudan, grow cash crops for export. Some, among them many of the West African negroes, are skilled craftsmen; others, like the Hausas, have for centuries been merchants and traders. But most of these people, be their work hard or relatively easy, lead lives that are natural to their environment, though in some cases their mode of living has been affected by the coming of the white man.

Most of the people of European descent are found either along the Mediterranean seaboard, or in South Africa.

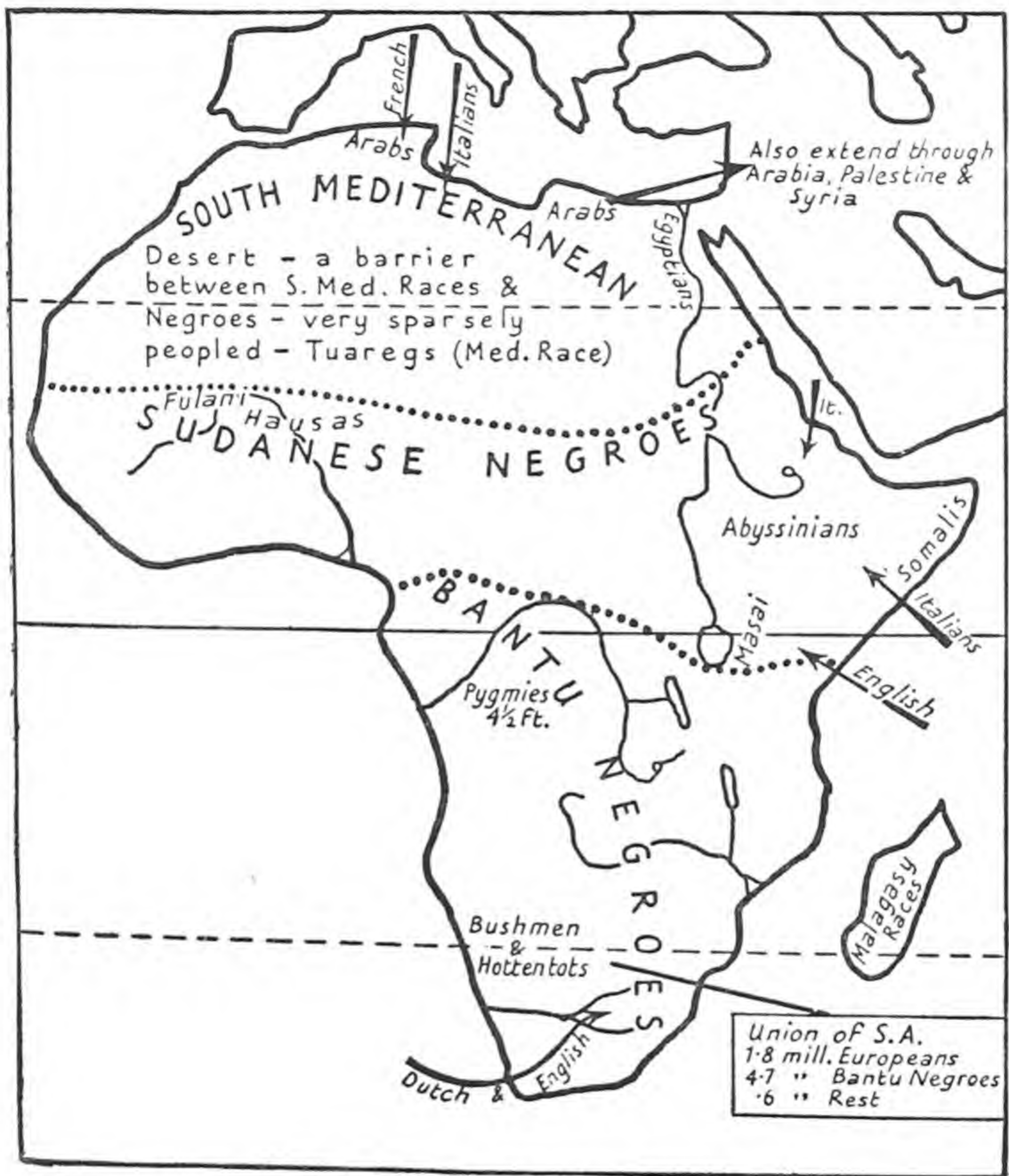


FIG. 2. Africa: Peoples.

There are many French settlers in Algeria and Tunisia, while numbers of Italians have settled in the latter country as well as in the adjacent land of Libya, easily accessible from Italy. In the Union of South Africa the white people are mainly of Dutch and British descent. A relatively small number of whites have made permanent homes in highland regions, such as Kenya and Rhodesia, where the elevation, by reducing the tropical heat, makes the climate suitable for settlement.

EXERCISES

1. Describe the chief difficulties encountered in the opening up of Africa.

2. Give examples of native Africans who are (a) hunters; (b) herdsmen; (c) farmers who grow cash crops for export; (d) traders and merchants. Give *two* reasons explaining how the mode of life of *one* of the above peoples is adapted to their environment.

3. Choose one African explorer and give some account of his work.

Sometimes it cracks under great strain, forming *faults*. When faulting takes place the strata on either side of the fault line sometimes slip against each other: one part rising up, the other slipping down and so forming terraces. In certain areas the horizontal layers of rock of which much of the African Plateau is composed were faulted in this way; and on the east, west, and south, the plateau descends by giant terraces to coastal plains, or low hills.

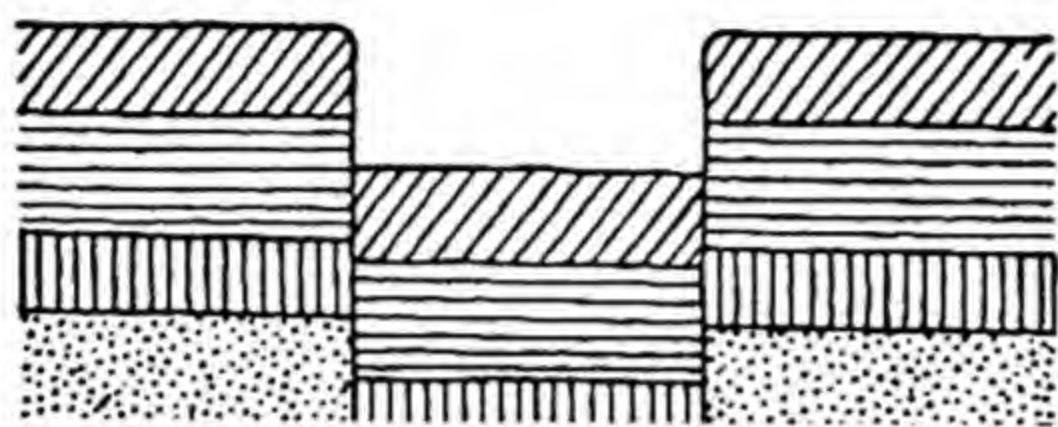


FIG. 4.

When two parallel faults occur, the strata between them often slip down, forming a valley whose sides rise steeply from its flat floor (see Fig. 4). Such a valley is called a *rift valley*. The *Eastern Rift Valley*, which trenches the African Plateau, is part of a great depression extending from Palestine through the Red Sea. Thence it may be traced through Abyssinia, past Lake Rudolf and smaller lakes, to Lake Nyasa. This flat-bottomed, steep-sided valley, from 40 to 60 miles wide, lies from 1,500 feet to 2,500 feet below the level of the surrounding plateau. The *Western Rift Valley* runs from Lake Nyasa, through Lake Tanganyika, to Lake Albert. These lakes, which are extremely deep and have precipitous sides, are called *rift valley lakes*. Lake Tanganyika is some 400 miles long and from 30 to 40 miles broad, and in places over 2,000 feet deep. Above its waters rise the scarped fronts of the surrounding plateau, which can be seen from shore to shore across the lake.

Lake Victoria, on the other hand, is a *basin lake*, lying in a comparatively shallow hollow on that portion of the plateau which rises between the Eastern and the Western Rift Valleys.

The disturbances in the Earth's crust which caused the formation of the rift valleys were accompanied by volcanic activity. The active volcano of Kirunga overlooks the Western Rift Valley; while on the east side of the Eastern Rift Valley the extinct volcanic peaks of Kenya (17,000 feet), on the Equator, and Kilimanjaro (19,300 feet) rise to summits ever clad with ice and snow.

The Rivers

The Congo, the Nile, the Zambezi, and the Niger are the longest rivers in Africa. The Congo and the Nile rise in the equatorial wet belt. The former river carries more water to the sea than all other African rivers combined, and its basin is exceeded in size only by that of the Amazon. The Nile, on the other hand, receives no tributaries in its middle and lower course, for it flows through a desert area. As the courses of the Niger and the Zambezi lie mainly in the savanna belts, their waters are highest in the hot wet season, and lowest during the cool dry season.

Though many of the African rivers are navigable for long stretches in their plateau courses, they are interrupted by rapids and falls where they tumble over the edge of the table-land to the coastal plain, or where they descend from higher to lower levels on the plateau itself. Only in the case of the *Nile* are these rapids far from the sea. Vessels of moderate size can ascend that river to the Aswan Dam, at the First Cataract. During the flood-season a lock allows vessels to proceed up-stream to Wadi Halfa, at the base of the Second Cataract, a distance of over 1,000 miles from the Mediterranean. The *Niger* is navigable to Rabba, 400 miles from the sea, and then, above a long stretch of rapids, for some hundreds of miles where communication is carried on by large shallow steel canoes. The *Zambezi* has a number of impassable rapids in its lower course. Ocean steamers can ascend the *Congo* to Matadi, a distance of 93 miles, above which the river pours over many falls

and rapids, which are avoided by a railway 200 miles in length. Above the rail-head the river is navigable for over 1,000 miles to Stanley Falls. Here, and at another series of falls higher up the Congo, transport is taken up by railways.

Of the chief lakes of Africa, Lake Victoria—the second largest sheet of fresh water in the world—is drained by the Nile, as also is Lake Tana in the Abyssinian Highlands; Lake Tanganyika, during the wet season, by the Congo; and Lake Nyasa by the Shiré, a tributary of the Zambezi. On the other hand, Lake Chad, on the southern margin of the Sahara; Lake Ngami, in the Kalahari Desert; and Lake Rudolf, in the Eastern Rift Valley, have no outlets to the ocean. Only a few streams enter these lakes which form centres of *Inland Drainage*. They are very salt, for as they lose much water through evaporation, large quantities of dissolved salts are left behind. Such salt lakes are often found in regions with little rainfall, where high temperatures (during at least part of the year) cause great evaporation.

EXERCISES

1. Draw a diagram to show how a rift valley is formed. Name an important rift valley in Africa.
2. What are the advantages and disadvantages of the African rivers for navigation? How do you account for the presence of falls and rapids on these rivers?
3. What do you understand by a region of inland drainage? In what parts of the world would you expect to find such areas? Give two examples (i) from Africa and (ii) from America.

CHAPTER III

AFRICA: CLIMATE, NATURAL VEGETATION, AND ANIMALS

Climate

AFRICA is the only continent crossed by the Equator, the Tropic of Cancer, and the Tropic of Capricorn. As it extends for almost equal distances north and south of the Equator the climatic belts are very similar on either side. About three-quarters of the continent lies within the tropical belt which is hot throughout the year, for the Sun is always overhead in some part of this region and consequently its rays shine down more or less directly over the whole area. But, owing to the elevation, the heat over a great part of the continent is less than would otherwise be the case, for temperatures decrease 1° with every 300 feet of ascent.

On account of Africa's almost unbroken coast-line, the moderating influence of the ocean does not extend far inland into the interior. This is especially the case in the northern part of the continent, which is not only broader than the southern portion but also joins the great land mass of Eurasia.

Temperature. Look at the map (Fig. 5) showing the July temperatures of Africa. At this season the Sun is overhead at the Tropic of Cancer (June 21st), and the hottest part of the continent lies north of the Equator, where temperatures over the Sahara and the Nile valley are very high. In the Sahara, owing to the lack of protective vegetation and to the absence of cloud, the ground gains heat rapidly in the day, and loses it equally rapidly at night. Thus there is a great difference between the temperature during the day and that at night: in other words, the daily range of temperature is great.

South of the Equator July is a winter month. Cape-

town is then about as warm as the north of Scotland is in summer.

Gradually the Sun appears to move south, and the belt of greatest heat—the 'Heat Equator', as it is called—swings

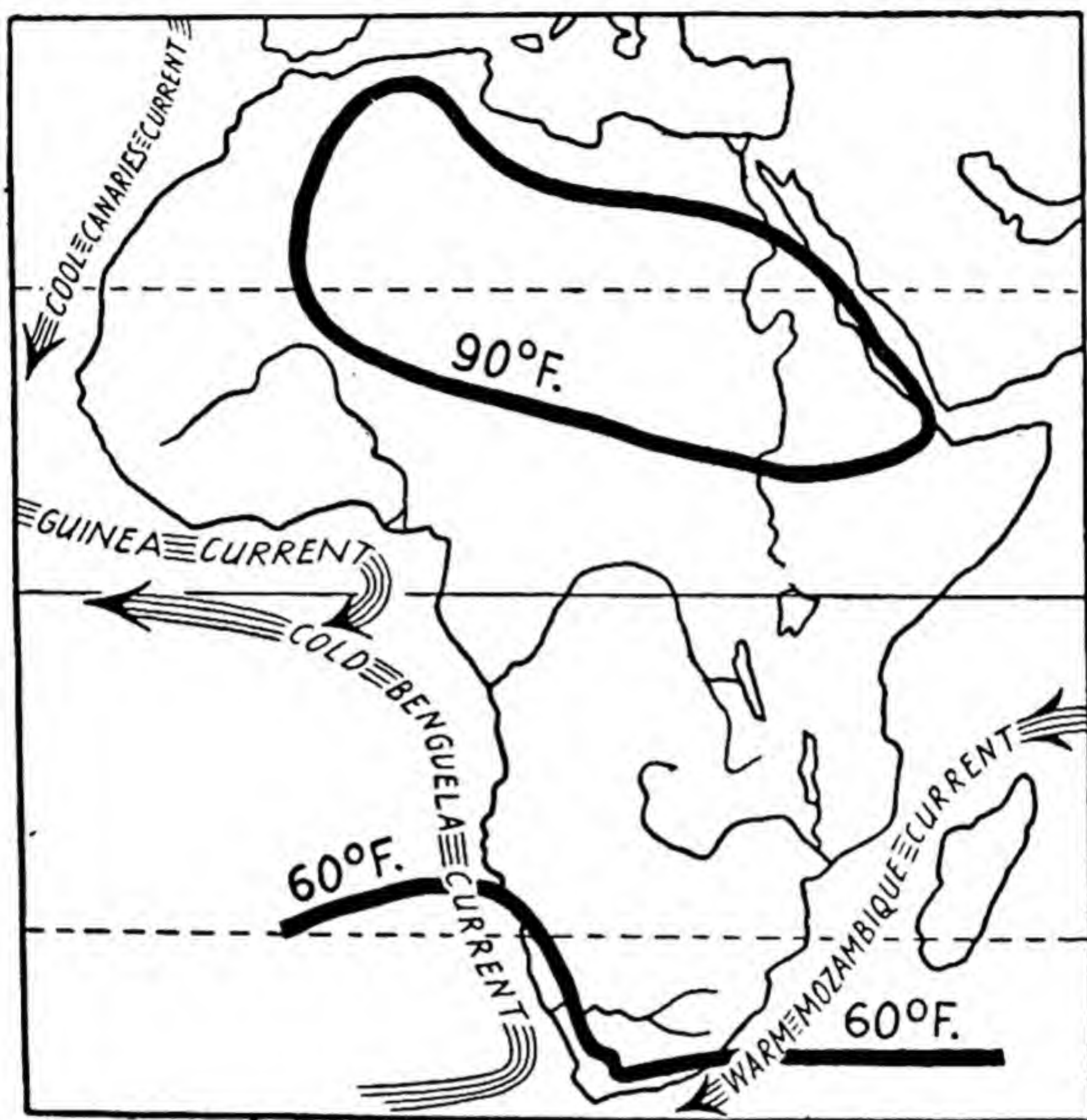


FIG. 5. Africa: July temperature.

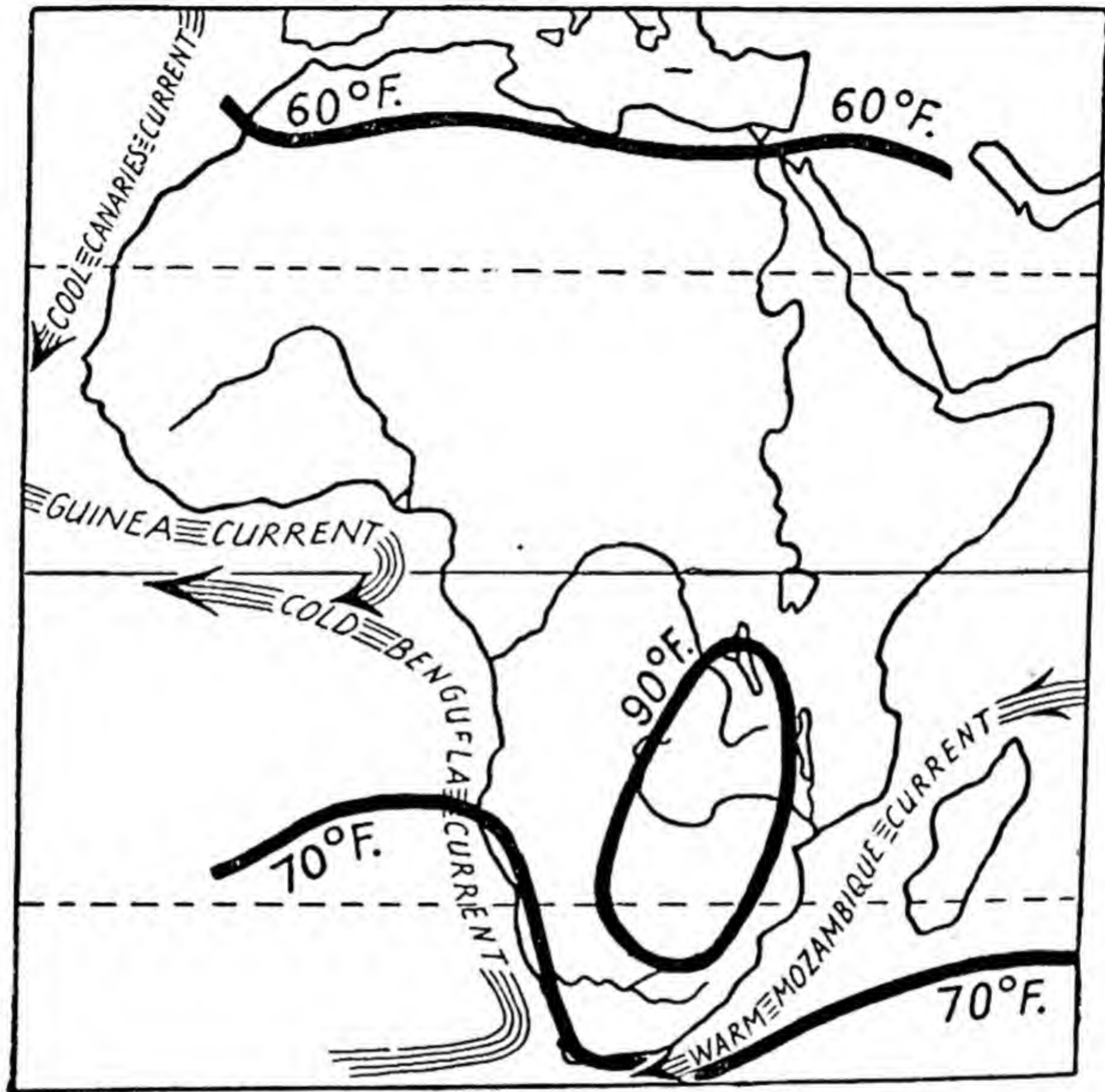
south too, but it moves more slowly than the Sun because the land takes some little time to get really hot.

Now look at the map showing the January temperature (Fig. 6).

By December 22nd the Sun is overhead at the Tropic of Capricorn. The hottest regions lie south of the Equator. South Africa is now enjoying summer. January and February are the hottest months at Capetown. In January the north of Africa is comparatively cool. In the Sahara average winter temperatures are about the same as in

England during summer, while in January Algiers is about as warm as Capetown in July.

The temperature maps show us that throughout the year the west coast of South Africa is cooler than the east coast.



In Africa the high-pressure belts, with outflowing winds, stretch right across the north and south of the continent, as does the low-pressure belt, with inflowing winds, which lies around the Equator.

When the North-East and South-East Trade Winds, blowing from the high-pressure belts to the equatorial low-pressure belt, meet, then currents of heated moisture-laden air rise, and being cooled by expansion cause heavy convectional rains (see p. 20, Pt. I). Hence in the equatorial belt rain falls throughout the year, but is heaviest shortly after the equinoxes in March and September.

Now, as we have seen, the 'Heat Equator' moves north and south with the apparent movements of the Sun. In a similar way the pressure, wind, and rainfall belts move north and south too. But though *the position of the noon overhead Sun varies from $23\frac{1}{2}^{\circ}$ N. at the Tropic of Cancer to $23\frac{1}{2}^{\circ}$ S. at the Tropic of Capricorn, the wind and rainfall belts move in the same direction only about 5° (i.e. 5° N. and 5° S. of the Equator (see Fig. 7)).* If the Sun were always overhead at the Equator, the regions of greatest heat, and the pressure, wind, and rainfall belts, would not alter their positions.

When the equatorial wet belt swings north with the Sun, the savannas lying on the north side of this belt receive summer rains, but the southern savannas are dry. When the equatorial wet belt swings south these conditions are reversed. The southern savannas receive summer rains, and the northern savannas have their cool dry season.

Now turn to Northern Africa. The North-East Trade Winds blowing across this great land-mass are dry, because as they move towards the hottest part of the continent they become warmer, and so tend to gather moisture rather than to deposit it. Thus in the trade wind zone there is a dry belt over the Sahara. There is a corresponding dry belt in the Kalahari Desert, lying on the western side of South Africa. We saw that in South America the Atacama Desert lies in a similar dry belt, on the west side of that continent. Neither

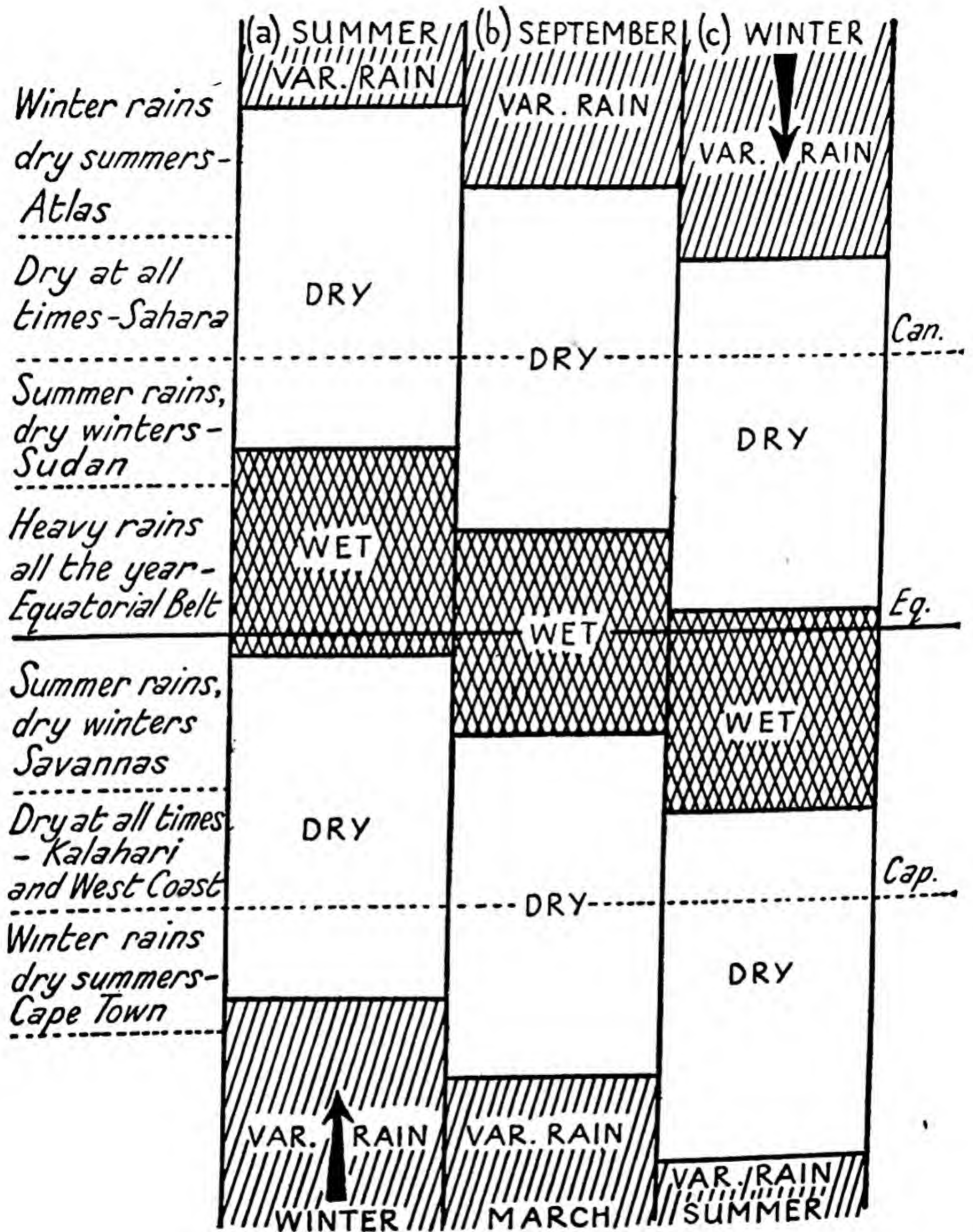


FIG. 7. Swing of the rain belts.

the Kalahari Desert nor the Atacama Desert extends right across its respective continent, partly because in both cases the South-East Trade Winds blow from the ocean on-shore towards the east coast. This dry belt is found in the trade wind zones on the west side of all the continents.

Hence the equatorial wet belt gradually passes on the north and south, through regions of summer rains, into dry belts where the rainfall diminishes with increasing distance from the Equator.

North of the Sahara the lands bordering the Mediterranean have dry summers and rainy winters. This is because in summer, when the wind and rainfall belts swing north, they lie in the dry Trade Wind Belt. But in winter, when the wind and rainfall belts swing south, the Mediterranean Lands lie in the belt of the Westerly Variables, which blow on-shore and so cause rain. This type of climate, as we learnt in the case of Central Chile, is called a Mediterranean Climate, because it reaches its greatest extent around the Mediterranean Sea. The diagram, Fig. 7, clearly shows the seasonal swing of the wind and rainfall belts.

Look at the map (Fig. 8) showing the rainfall from May to October. Remember that the rainfall belts have swung north, with the apparent movements of the Sun, as shown in column (a) of Fig. 7.

1. The extreme south-west of Africa receives rain, for it lies on the northern edge of the Variable Rain Belt which has shifted north.

2. The west coast, to the north of the latter region, receives little or no rain, for it still lies in the Dry Belt.

3. The Savanna lands, immediately to the north, lie in the Dry Belt and receive practically no rain.

4. The wettest region in the continent lies a little north of the Equator, though the actual region round the Equator itself remains on the margin of the Equatorial Wet Belt. One of the wettest portions in this belt is found along the coast-lands of the Gulf of Guinea, for there the Trade Winds

blow in from the ocean and deposit heavy rain on the windward slopes of the highlands.

5. The Sudan—the savanna region stretching from the middle Niger to Abyssinia—which lies on the northern edge of the Equatorial Wet Belt, is receiving summer rains.

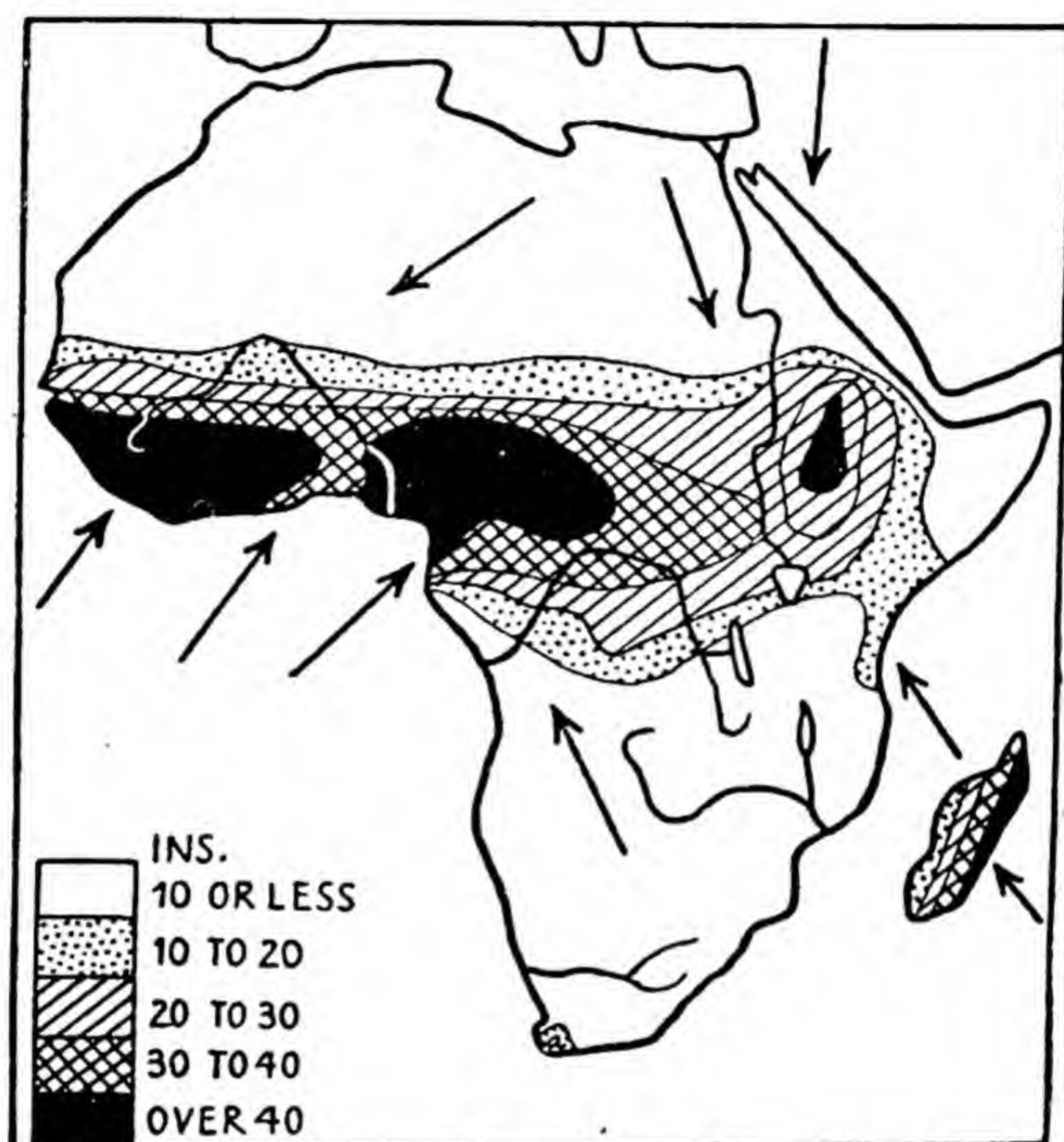


FIG. 8. Africa: Rainfall, May to October.

6. The Sahara is still in the Dry Belt.

7. The Mediterranean Lands of Northern Africa are also receiving little rain, for now they lie on the northern margin of the Dry Belt.

Now turn to the map (Fig. 9) showing the rainfall from November to April. The wind and rainfall belts have swung south as shown in column (c) of Fig. 7.

1. The lands bordering the Mediterranean Sea receive winter rain, for now they lie on the southern edge of the Variable Rain Belt that has shifted south.

2. The Sahara remains dry, for it still lies in the Dry Belt.
3. The Sudan is also dry, for it lies on the southern edge of the Dry Belt which has shifted south.
4. The wettest region lies a little south of the Equator.

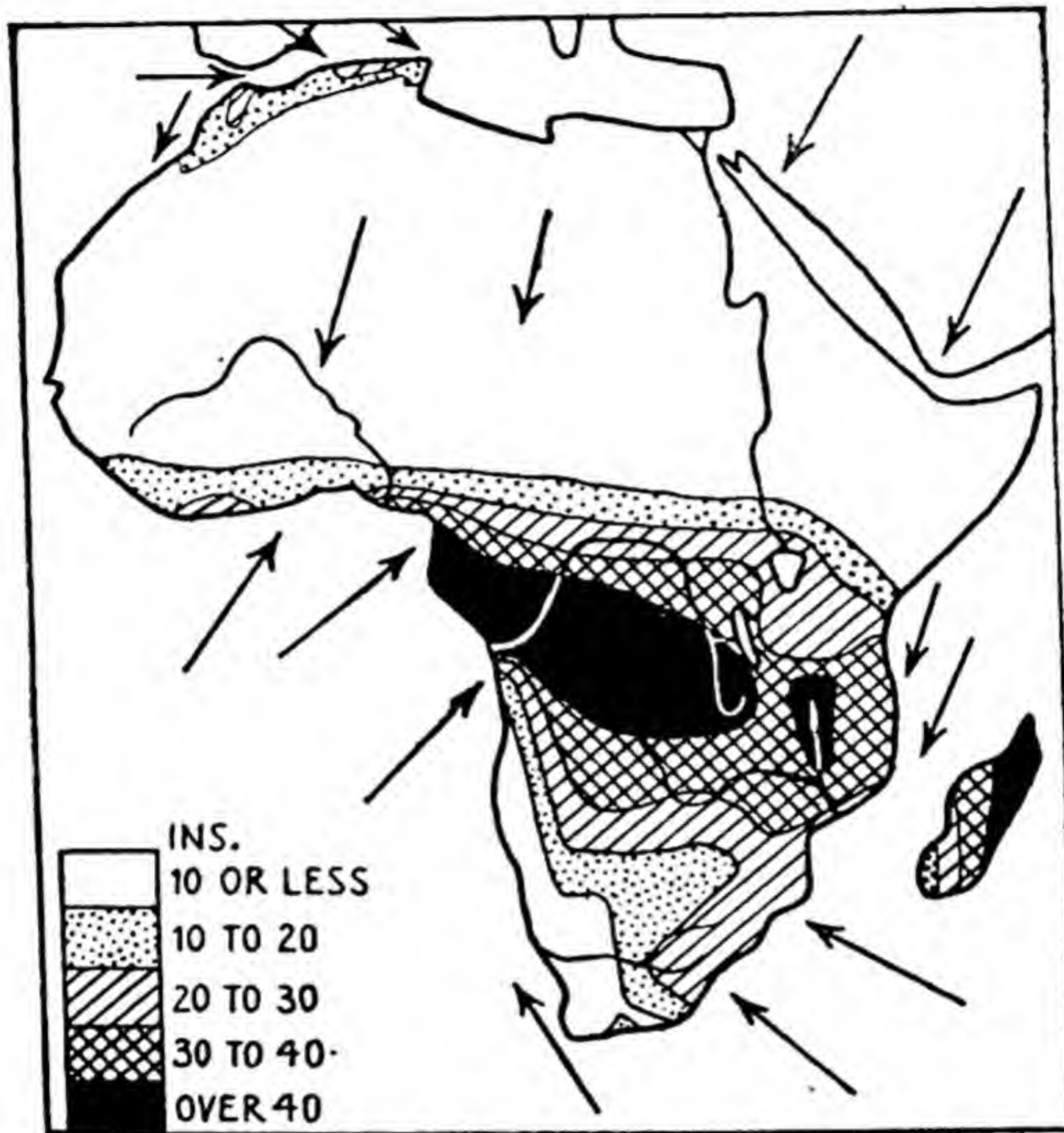


FIG. 9. Africa: Rainfall, November to April.

5. The southern savannas are receiving summer rains, for they lie on the southern edge of the Equatorial Wet Belt.

6. The west coast of Africa is dry, for both the Kalahari Desert and also the extreme south-west now lie in the southern Dry Belt, where the South-East Trades are blowing off-shore. But the east coast of South Africa, where the South-East Trades are blowing on-shore from the Indian Ocean, receives rain.

Natural Vegetation and Animals

In Africa, as we have seen, the rainfall belts on either side of the Equator correspond closely to one another. As rainfall, more than any other climatic factor, affects natural

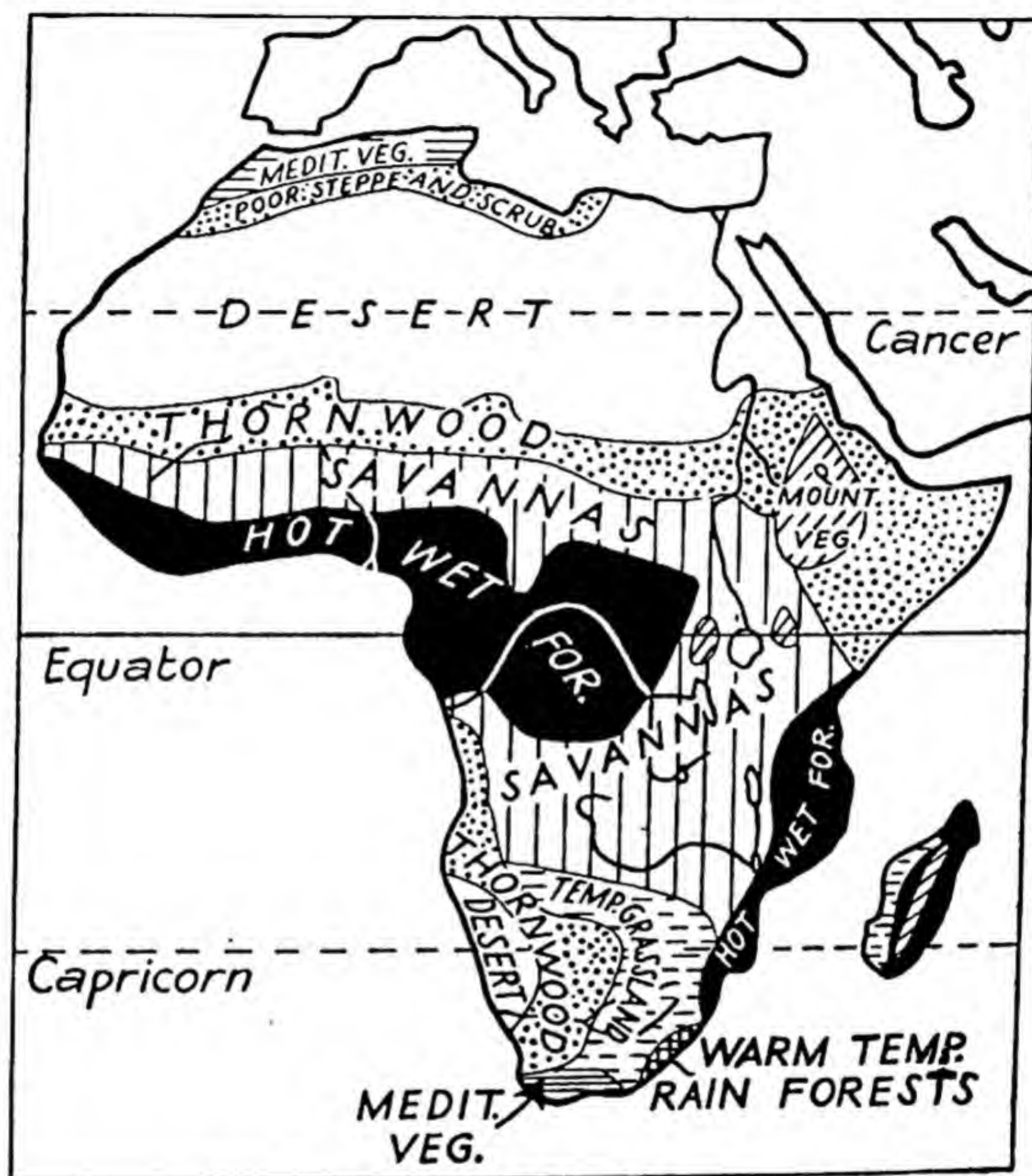


FIG. 10. Africa: Natural Vegetation.

vegetation, we find very similar vegetation belts on both sides of the Equator.

1. *The Equatorial Forest Belt.* Dense forests spread along the shores of the Gulf of Guinea and cover the greater part of the Congo Basin. As the climate is always hot and wet there is no resting time for plants and trees, and so the vegetation is rank and luxuriant. From the dense undergrowth spring palms of various kinds, and other giant trees,

many festooned with vines, and creepers with aerial roots called *lianas*. Along the east coast of tropical Africa is a belt of somewhat more open forest, where the trees are smaller and the woodlands broken with stretches of thorn-bush.

In the hot wet forests food is abundant throughout the year, and because of the high temperatures the animals do not need warm coats like those living in the coniferous forests. Owing to the dense vegetation there is little room to move, and many animals are mainly tree-dwellers; such are the gorilla and the chimpanzee, whose long arms enable them to swing from branch to branch. Some animals, like the hippopotamus, which lives chiefly on roots, grass, and aquatic plants, live by the rivers; and others, such as the elephant, are found in the more open areas where the forests merge into the savannas.

The Savannas. Except in the western lowlands of the Congo Basin, and along the Gulf of Guinea, the hot wet forests are surrounded by savannas. The grasslands of the Sudan stretch from the Upper Niger to Abyssinia, thence southward through East Africa to Angola and Rhodesia. In the dry cool seasons the savannas are withered and brown, but as soon as the rains commence the grass springs up in clumps from 6 to 12 feet high. Belts of trees of various kinds form 'gallery forests' along the valleys, but on the savannas themselves the scattered acacias and baobabs are of the drought-resisting type, able to withstand the lack of moisture in the dry season.

Hoofed animals, like antelopes, giraffes, and zebras, are herbivorous, feeding on grass and foliage. The long neck and forelegs of the giraffe enables it to reach the leaves and juicy shoots of trees like the acacias, which it greatly relishes. These ungulates can move swiftly from place to place in search of food, which is often scarce in the dry season, or when pursued by their enemies, such as lions, hyenas, and other carnivores (flesh-eaters).

Tropical Thorn-bush. On their poleward sides, as the dry

season grows longer and longer, the savannas become more and more arid until they merge into the thorn-bush which margins the deserts. In some places the grey scrub of prickly leafless bushes forms an impenetrable jungle; in others it consists of more open bush separated by patches of rocky and stony ground. Here and there are umbrella-shaped acacias and other drought-resisting trees whose leathery leaves are covered with a prickly brown wool. Desolate indeed is the scene during the long dry season when the sun blazes down fiercely upon the parched rock-strewn land. 'Grey is the landscape, grey the stony ground, and grey to silver-white are the trees and bushes around. Here and there large grey lizards sun themselves and grey monkeys now and then appear in the tree branches, but these are the only signs of life in these deadly calm surroundings.'¹ But during the rainy season a transformation takes place; and for all too short a time the scrub is decked with flowers, buds open, countless herbs spring from the soil, and the whole landscape is clothed in a mantle of green. But the verdant season is soon over. Green gives way to gold, and gold to grey, as the plants wither and sink into their long summer sleep.

The Hot Deserts. The transitional thornwood belt merges into the Sahara on the north and the Kalahari Desert on the south. In the Sahara monotonous stretches of flat-topped rocks, ridges, and wave-like dunes spread to the horizon. Cultivation is only possible in the oases, where date-palms thrive, and cereals and vegetables are grown in little irrigated fields. The chief animal is the camel, but antelopes may sometimes be seen on the desert margins, as well as lions, whose uniform colouring blends equally well with the rocks and sands and the brown savanna grasses.

The Mediterranean Lands. Both in the Mediterranean countries of Northern Africa, and in those with a similar climate in South Africa, the natural vegetation is adapted

¹ M. E. Hardy, *A Junior Plant Geography* (Clarendon Press).



1. SCENES IN THE KALAHARI AND THE SAHARA

(Above) This scene well shows the nature of the ground and the vegetation of the Kalahari, which is not a true desert like the Sahara. This giant creeper is slowly strangling a thorn-tree (see p. 44). (Below) The low black tents, woven from camel-hair or sheep-wool, of a Bedouin encampment on the edge of the Sahara. The strong short shadows give a good idea of the intensity and height of the sun. The animals are widely scattered owing to the sparseness of the herbage (see p. 42).



2. WHERE LIFE CHANGES LITTLE WITH THE PASSING CENTURIES

(Above) The characteristic feature of this village, near the Niger in the Western Sudan, is the tiny spire at the top of the huts. The large jars are used for storing grain, ground-nuts, and so on. The goat tethered to the hut, and the hen, are typical of African villages (see p. 62). (Below) Fellahin working a shaduf on the Nile. The bowls are dipped into the water and raised by means of the counterweights at the thick end of the poles. The whole operation takes little more than a second (see p. 54).

to withstand the long summer drought. Evergreen shrubs, such as myrtle and laurel, have thick, hairy or oily leaves which help to prevent undue loss of water.

Warm Temperate Grasslands cover much of the High Veld of South Africa.

In Natal *Warm Temperate Rain Forests*, of wonderful luxuriance, stretch from the lower seaward-facing slopes of the uplands to the coast. Along the coast grow coconut and other palms, also sugar-cane and banana plantations.

Mountain Vegetation. In Abyssinia and the Lake Plateau of East Africa, the hot wet forests of the valleys or coastlands are replaced at higher elevations by cool temperate forests with junipers, cedars, and other trees. Above, at still greater heights, forests are succeeded by upland pastures and mountain vegetation, which ultimately merges into the eternal snows.

EXERCISES

1. (a) On what dates is the Sun overhead at the Equator?
(b) What are these dates called? Why?
(c) Where is the Sun overhead on June 21st?
(d) Where is the Sun overhead on December 22nd?
(e) In what months is the region of greatest heat around the Equator?
(f) During what months does the region of greatest heat lie (i) north, and (ii) south of the Equator?
2. What are convection currents? Illustrate your answer by a diagram. (see *South America*, p. 20).
3. Why is the west coast of South Africa cooler than the east coast?
4. Find the following on a map of Africa: Capetown, Lagos, Khartoum, and In Salah (Sahara). State at what season each receives most of its rain. In the case of *one* of them give the reasons for your answer.
5. (a) Name *three* wild animals living in the equatorial forests, and *three* found on the savannas. (b) Show how *one* in each region is adapted to its environment.
6. (a) What is the name of the desert on the west coast of South Africa? Account for its position, illustrating your answer by a sketch-map. (b) What deserts are found in similar latitudes along the west coasts of (i) South America, and (ii) Australia?

CHAPTER IV

THE MEDITERRANEAN LANDS OF NORTH-WEST AFRICA

Between the Mediterranean and the Sahara

NORTH-WEST AFRICA consists of Morocco, Algeria, Tunisia, and Libya. These countries have a Mediterranean climate, with a varying amount of rain in winter, and hot dry summers, when day after day the sun blazes down from a cloudless sky. The rainfall decreases from the Atlantic seaboard eastwards; and from the Mediterranean southward towards the desert margin. Behind the Mediterranean coast-lands rise the Atlas, which extend from the Atlantic eastward to the Gulf of Quabes; farther east lie the lowlands of Libya, backed by the Saharan Plateau. In the west, where the ranges rise to over 13,000 feet, snow-clad peaks tower into the limpid blue. Between the Maritime and Saharan Ranges of the Atlas lie High Plateaux, dotted in the west with salt lakes, called *shotts*, that are often of considerable size. To the south, the ranges descend to the Sahara.

Morocco, Algeria, and Tunisia

In Morocco, Algeria, and Tunisia we may distinguish three Natural Regions: (1) the Coast-lands and the Tell; (2) the High Plateaux and Ranges of the Atlas; and (3) the Saharan Region.

1. *The Coast-lands and the Tell.* Picture a rocky coast where low broken ranges drop to the sparkling blue waters of the Mediterranean Sea. Between these ranges and the main chain of the Atlas lies the Tell, which consists mainly of rolling country cut up into many fertile plains and valleys. The Tell stretches westward into Morocco, where a strip of barren country separates it from the coast; and eastward

into Tunisia. The slopes of the hills are planted with olives, which require little moisture, and vines which thrust their long roots far into the soil in search of water. The lower parts of the valleys, irrigated, and carefully cultivated, are green with orange and lemon groves, and fields of tobacco. Much barley and wheat are grown on the plains. Sown in autumn, and watered by the winter showers, these cereals are harvested in April and May respectively. Owing to the lack of summer pasture, due to the absence of rain, few cattle are bred. But many sheep and goats are grazed on the uplands, where the rough herbage is broken by stretches of evergreen shrubs, growing about as high as a man's knee, and forests of cork-oak, cedar, and squat flat-topped Mediterranean pines.

The large farms are owned by Frenchmen, who adopt large-scale methods and use modern machinery. The smaller ones belong to the Arabs or Berbers whose ways are more primitive. They cut their wheat and barley with sickles, and take it to the village threshing-floor where donkeys or oxen tread out the grain, while the winnowing is done by tossing it into the air and allowing the wind to blow away the chaff. Most of the Berbers live in the compact villages in the valleys, or in hill-top towns which in more warlike days, before French rule, provided protection against enemies.

2. *The High Plateaux and Ranges of the Atlas.* On the sheltered High Plateaux, lying between the Maritime and the lower Saharan ranges of the Atlas, the rainfall is less and the winters are decidedly colder than those of the Tell. Much of this upland region is covered with esparto grass, used for making paper; and with sweet-smelling herbs on which sheep and goats, which thrive in this dry region, browse in charge of swarthy men and lads. Some of these folk belong to the Kabyle tribes, descendants of the people who lived in this part of Africa before the Arabs swept over the country in the eighth century.

The Saharan Margin. As we should expect, the Saharan slopes of the Atlas receive little rain. Here and there, amidst the waste of flat-topped rocks and sand, oases are found where underground springs, or the artesian wells that have been bored in recent years, supply water to irrigate the thirsty land. The graceful palms surrounding such oases provide dates, which are their main, if not their only export. From such oases as Colomb-Bechar or Touggourt the dates are sent by rail to the coast for export. From others, like Tafilet, they are dispatched by camel caravan.

Morocco

Morocco was for long the home of bellicose tribes whose chief occupations were robbery and fighting, and even to-day the Moors are noted for their war-like disposition. But these sturdy warriors have been subdued, and the country, though still nominally governed by a sultan, is under the protection of France and Spain. The French protectorate comprises the greater part of Morocco. The Spanish zone is in the north where the chief port, *Ceuta*, faces Gibraltar, on the opposite shore of the narrow strait leading from the Atlantic to the Mediterranean. *Tangier*, a little to the west, is an international port.

The valleys trenching the western end of the Atlas, and the lowlands, stretching to the Atlantic, are the most productive and thickly peopled part of the country. But where irrigation is not possible the vegetation dies, and the desert gradually closes in on these green oases. Standing in an oasis of palms, with the snow-capped peaks of the Atlas in the distance, is *Marrakesh*, a caravan centre (Plate 3). In the streets, Moors in flowing robes, Jews and negroes, veiled women, and nomads from the desert pass to and fro. An occasional motor-car may be seen, but for the most part transport is carried on by camels and mules. Somewhat similarly placed, and surrounded by olive groves, is *Fez*, another caravan centre. Both towns are linked by rail with

the modern port of *Casablanca*, whose white-walled houses overlook the great harbour built by the French on the Atlantic seaboard. From *Casablanca* considerable quantities of fruit and vegetables are sent by air to *Toulouse*, in France.

Algeria

Algeria, lying between Morocco and Tunisia, is four times the size of France, and has a population of somewhat more than seven millions. Little more than a century ago the ports along the coast were the haunts of blood-thirsty pirates who scoured the Mediterranean, descending on peaceful merchant-vessels, and, raiding far and near, sacked the coastal towns of Italy and Spain. Algiers was one of the strongholds of these pirates. From time to time, British, French, and Dutch fleets bombarded the city, but still the Arab pirates flourished. It was not until 1827 that France finally captured the city, and thus laid the foundations of what is now the most prosperous of her colonies.

The French have done much to develop Algeria by building roads and railways, encouraging agriculture, and promoting mining. Much iron-ore is mined round *Philippeville* and *Oran*, and phosphate rock, used for fertilizing the land, is quarried. Railways link Algiers with *Casablanca* and *Tunis*, while several lines run inland, across the Tell, and through steep valleys in the Atlas to the edge of the Sahara. One such line goes from *Oran* to the oasis of *Colomb-Bechar*. Another runs from the port of *Philippeville*, by way of *Constantine*, and through the shadow-filled *El Kantata* gorge—a deep cleft in the rocky wall—to *Biskra*, a caravan centre on the edge of the Sahara, whence, for military purposes, the railway has been pushed south to the oasis of *Touggourt*.

Algiers, a city of 250,000 people, and the capital of the colony, stands on a long sweeping bay, backed by low hills that rise steeply from a fringe of golden sands. One of the

chief ports in Northern Africa, it is 400 miles from Marseilles, the French port through which passes the bulk of Algeria's overseas trade. The exports of the colony remind us that agriculture is the mainstay of the country. They include wines, cereals, sheep, olive-oil, and esparto, as well as iron-ore and phosphates. The chief imports, which remind us of the undeveloped state of manufacturing, are textile goods, motor-cars, beet-sugar, machinery, and coal.

Tunisia

Tunisia, with its wheat-lands, vineyards, orchards, and olive groves, lying between the Mediterranean and the Sahara, is a French Protectorate. In addition to the Arab population there are a number of French colonists and Italian settlers, for Tunisia lies relatively close to Sicily and Southern Italy.

The railway from Algiers runs through the fertile Majerda valley to *Tunis*. The capital consists of an old walled town, and newer quarters beside the harbour, from which a deep-water canal runs to the sea, some 6 miles away. The carpets, leather, metal goods, and pottery displayed in the bazaars of the old quarter show that many of the people of Northern Africa are skilled and artistic craftsmen. Tunis is situated south of the site of Carthage, the historic Phoenician city destroyed by the Romans, which commanded the route from the western to the eastern basin of the Mediterranean. To-day, the naval port of *Bizerta* stands sentinel over this important sea-gate on the route to India and the Far East. *Sfax*, second only in importance to Tunis, exports grain, olive-oil, phosphates, and wines, mainly to France.

Libya (Tripoli)

By annexing Tripoli, in 1912, the Italians extended their territory into that part of Northern Africa which was the great granary of the Roman Empire. Libya, as Tripoli is

now called, is four times the size of Italy, but in the whole country the coastal region is the only area suited to cultivation, for the greater part lies within the Sahara where fertile spots are confined to oases, such as Ghadames and Kufra. Even in the coastal belt the winter rains provide insufficient moisture; for most crops irrigation is necessary, though the area available for farming has been extended by



FIG. 11. Morocco, Algeria, and Tunisia

boring artesian wells. Wheat, vines, olives, oranges, and mulberries are cultivated, while the dunes have been planted with pines, acacias, and other trees. Swarthy fishermen, as in centuries past, dive for sponges and catch tunny in the coastal waters.

On its landward side the coastal belt rises to the edge of the African plateau, passing through steppe-desert into the Sahara. In the steppe zone the Bedouin Arabs grow barley and wheat, returning from their seasonal migrations in November to sow their crops, and in April or May to harvest them. But the rainfall is scanty and unreliable, and cultivation is correspondingly difficult. The dry climate is better suited to herding, and the chief wealth of these nomads—if wealth it can be called—lies in their flocks of sheep, goats, and camels which browse on the stunted bushes and tufts of yellowish grass.

The native population consists mainly of Arabs and negroes, descendants of slaves brought from the Sudan. Most of the European settlers are Italians, the majority of whom are farmers living in the coastal zone. Many peasants settled here in 1938 and subsequently, under a mass-migration scheme organized by the Government. In 1938, 1,800 families, drawn from all parts of Italy, and with an average of ten persons to a family, were established on new farmsteads. Their houses were furnished for them, and they were supplied with implements, seed, and cattle. With a view to further development of the country, and for strategic purposes, the Italians have built a motor-road, stretching for 1,200 miles along the whole length of the coast from the Tunisian to the Egyptian frontier.

Tripoli, the capital, a city with 100,000 inhabitants, once one of the dirtiest and most unhealthy of Mediterranean ports, is now clean and prosperous. There is a daily air-service to Rome. Like *Benghazi*, on the Gulf of Sidra, it is a caravan centre, whence trains of camel cross the Sahara following routes used from time immemorial. Much trade is also carried on by vessels, plying between the ports, or sailing across the Mediterranean to Malta, Syracuse, Naples, and Genoa.

Libya was conquered by British troops in 1940-1.

EXERCISES

1. (a) Describe, without reasons, the chief features of a Mediterranean climate. (b) On which side of the continents is this type of climate found? (c) Name *one* region, outside Africa, which has this type of climate.

2. Into what *three* natural regions may we divide Morocco, Algeria, and Tunisia? Confining your answer to *one* of these countries describe the chief products of the most important region and show how the plant life is related to the climate.

3. Say what you know of the following towns, and in each case draw a sketch-map to illustrate your answer: Algiers, Tripoli, and Tunis.

4. Show how the lives of the people living in Libya are adapted to their environment.

CHAPTER V

THE DESERT LANDS—THE SAHARA AND
THE KALAHARI

The Vast Sahara

BOTH the Sahara and the Kalahari lie in the trade wind belts. The Sahara is the greatest desert in the world. It stretches for 1,200 miles from the Mediterranean Lands southward to the savannas of the Sudan; and for 3,000 miles from the Atlantic to the Red Sea, beyond which deserts and arid lands extend north-east to the Gobi Desert of Central Asia. The Kalahari of South Africa is much smaller. It is confined to the western side of the continent, for the South-East Trade Winds blowing from the Indian Ocean bring rain to the eastern part of this region.

Owing to the swing of the rain belts, the northern margin of the Sahara receives about 10 inches of rain during winter, and the southern margin approximately the same amount in summer. The highland belt, stretching across the Sahara, is also more fortunate in its rainfall than the lower portions of the great table-land. But most of the Sahara is quite rainless for years on end, though occasional down-pours occur at intervals varying from two to as much as seven years. Then the *wadis* are filled to the brim, and the underground water-supplies lying in the valleys replenished. The atmosphere is so dry that it is almost impossible for anyone who has not experienced its intense and parching dryness to conceive what it is like. Both the seasonal and the daily range of temperature are great. In summer the heat is intense. Even in winter it is as hot in the daytime as it is in England in the height of summer. The absence of clouds allows the sun to beat down fiercely upon the bare ground during the day, but at night temperatures fall

quickly, because owing to the absence of cloud radiation is great and the escaping heat is unchecked.

As a result of rapid expansion during the day, and equally rapid contraction at night, the surface layers of the rocks split—often with such explosive violence that travellers say that their night's rest is sometimes disturbed by the noise of

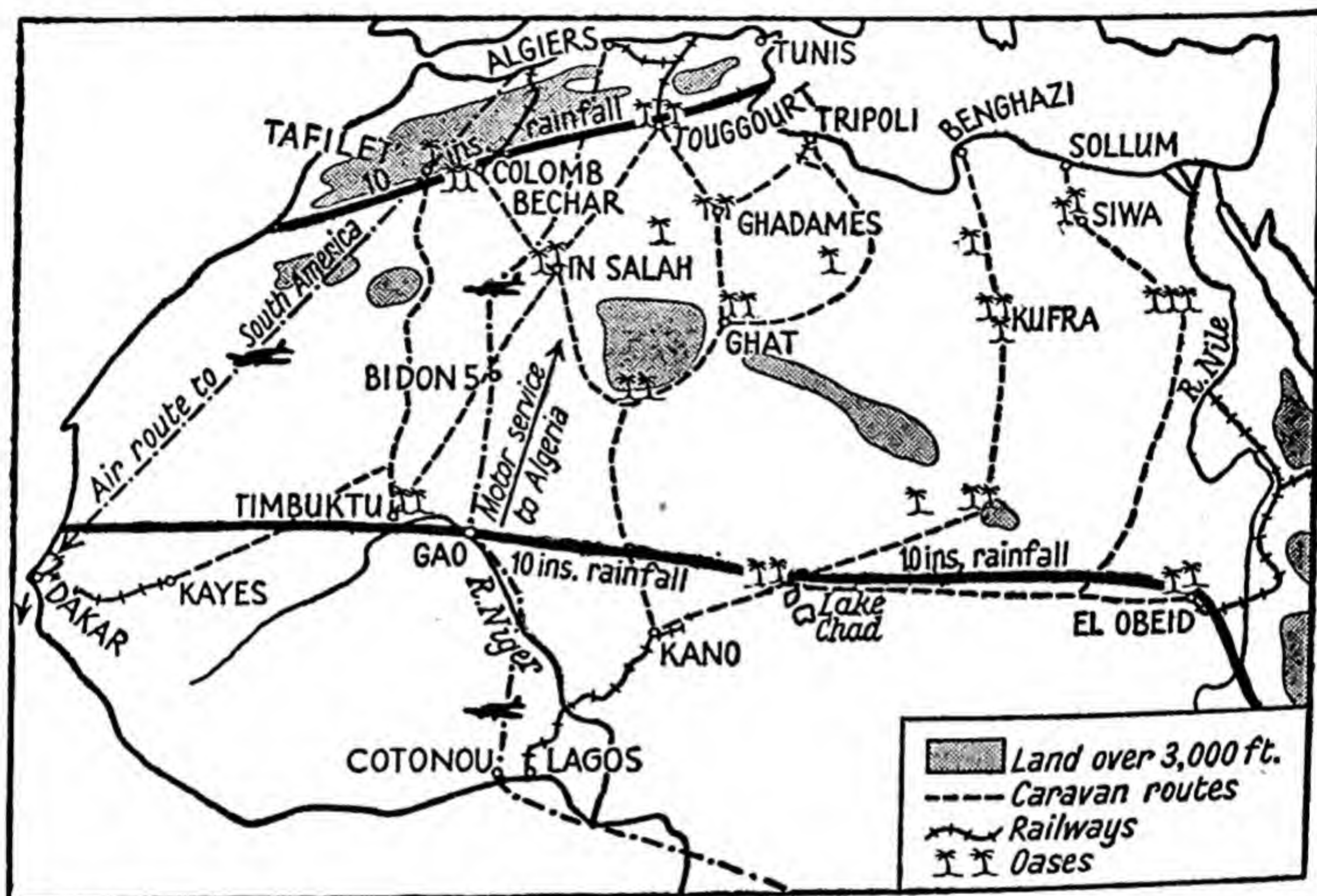


FIG. 12. The Sahara

'explosions', caused by the breaking fragments of rock. The broken pieces are scattered in all directions. The smaller ones are carried by the wind, driven against rock faces, and ground down into sand.

The surface of the Sahara is of three types—rocky, stony, and sandy. The chief areas of rocky and stony desert lie in the west, and in the centre, where they stretch from Lake Chad northward to the Tibesti Highlands. Flat-topped plateaux and bare hills, separated by *wadis*, characterize the rocky regions, while the stony districts consist of barren wastes of pebbles.

Sandy desert, or *erg*, extends from the frontier of Egypt, through Libya, into the region south of the Atlas Mountains. The dunes are swept by the wind into wave-like ridges, several hundreds of feet high, which slope up gradually on their windward side, but drop steeply on their leeward side. In some cases the surface is quite hard, but in others the valleys between the dunes are filled with sand so soft that camels sink knee-deep into it, making travel difficult even for experienced cameleers.

In some districts grasses and dwarf bushes, whose long roots go down to great depths in search of water, help to bind the sand-dunes together. In regions which receive some rain, as for example the desert margins, coarse steppe and scrub provide grazing for animals. But large areas are almost devoid of vegetation: such, for instance, is the Tanezruft, the dreaded 'Land of Thirst', in the Central Sahara.

Oases—Gardens of the Desert

The oases, which lie in depressions, or along the foot of heights, where underground supplies of water have collected, form belts of green amidst the sun-baked rocks and orange-coloured sands. Under the shade of date-palms, cereals such as millet, barley, and wheat are cultivated; and vegetables, cotton, tobacco, and sugar-cane are grown in banked-up fields criss-crossed by irrigation channels. Sometimes the water is drawn from wells, but usually it is obtained from pools from which it runs through a main channel into innumerable smaller ones, the flow being regulated by means of sluices. Owing to the great evaporation the ground becomes very salt, and unless well manured is quite useless after a number of years. In the date-groves manuring is especially important. The oasis-folk grow most crops for their own use, but dates are produced mainly for export.

Some oases are quite small, being only an acre or so in

extent, but others are much bigger. Tafilet, Colomb-Bechar, and Biskra, lying south of the Atlas Mountains; Tuat in the north-west of the Sahara; and Kufra and Siwa in Egypt are all large, each having thousands of date-palms, and containing several compact and densely peopled villages.

Such villages consist of a number of houses built of stone or mud, with flat roofs. They usually contain a mosque, a school, and a market-place where the sellers squat behind their wares laid out on the ground. In these settlements, encircled by walls, as much for protection against encroaching sand as for defence against foes, the oasis-people lead a tranquil life. Their way of living is very different from that of the herding-tribes, who from the necessity imposed by the seasonal scarcity of pasture are nomadic. These herdsmen exchange their wool and hides for dates and other crops grown by the oasis-folk. But no love is lost between the pastoral nomads and those who till the land.

Camel, Car, and 'Plane

For centuries trade in the Sahara has been carried on by camel caravans. Routes go from well to well, and from oasis to oasis, avoiding so far as possible the *ergs*, and crossing the rocky and stony areas where the 'going' is easier. Journeys take weeks and often months; for though racing camels can cover a hundred miles a day, baggage camels can only do from 20 to 25 miles. Sometimes those fearful sandstorms, called *simooms*, are encountered; or, what is worse, travellers arrive at a well only to find that it has dried up and the next one is far ahead. Then death stares them in the face. On occasions merchants are attacked by robber bands, such as the veiled Tuaregs, long known as raiders, who swoop down upon any caravan that is not strongly guarded. But in the Sahara the dangers that threaten travellers are not so great as formerly, owing to the strong

rule of the French and the Italians, who keep troops to maintain order, and have built forts, linked with the outside world by telegraph, radio, and aeroplane, as well as by swift camel corps.

Nowadays the number of caravans engaged in trans-Saharan trade is decreasing, for goods are conveyed by camels to railhead towns on the desert margin, such as Colomb-Bechar and Touggourt in Algeria; El Obeid in the Anglo-Egyptian Sudan; and Kano, in Northern Nigeria.

Transport is also carried on by means of lorries and motor buses—strange, streamlined vehicles, with rows of portholes along each side, whose average speed is from 10 to 20 miles an hour. On recognized routes there are petrol stations about every 60 miles—isolated posts where water costs almost as much per gallon as the petrol itself. For instance, Bidon 5 petrol station, in the centre of the Sahara, is 300 miles from the nearest water-supply. Its steel aerial lighthouse by day looks like a giant skeleton against the brazen sky; but by night sends its guiding beams far across the desert. The aeroplane is annihilating distance, though its use is confined mainly to officials, as owing to the high cost this form of transport is for the few rather than the many.

Land travel over the desert is undoubtedly hard and monotonous. But to those of us who have observed it from the air the landscape presents a fascinating sight. Ridges and valleys, rocks and boulders stand out in bold relief. Here in an oasis, with its palms and flat-roofed houses, the people themselves can be clearly seen, as they pause in grove and field to look up at our winged liner zooming overhead. And there a line of shadows on the sand soon proves to be those of camels padding their way across the lonely waste.

Camel, car, and aeroplane, each faster than the other, bridge the Sahara, once almost unknown but now being steadily opened up.

The Kalahari

Though parts of the Kalahari consist merely of arid wastes, this region is not a true desert like the Sahara, and is by no means entirely waterless. The rainfall is light, but the occasional showers stir into life dormant seeds that grow rapidly, and for a space carpet the ground with flowers. To quote an explorer of the Kalahari: 'After rain the long grasses shoot up green, succulent, and elbow deep; flowers spangle the desert in every direction; the air is full of fragrance; and the hollows on every side are filled with water. But another month and all is drought; the hollows, or pans, are dry again, and travel is full of difficulty.'

The lack of vegetation is, of course, due to absence of rain, for plants require moisture in order to live. They gather it from the soil through their roots and give it out through their leaves. Thus many grasses and plants have very long roots which extend far into the ground in search of moisture; and others have bulbous, water-storing roots protected by a leathery coat. Some, like the cactus, have tough thick skins, which help to lessen the loss of moisture. Thorn bushes, greyish-green sage bushes, and trees like the tamarisk have tiny tough leaves, which are further aided against loss of water by a coating of wax or hairs.

In the Kalahari desert there are scattered springs and water-holes, but no large oases like those in the Sahara. Neither are there civilized peoples like the Arabs and other South Mediterranean folk who dwell in the great desert of Northern Africa. The only people who live in the Kalahari are the yellow-skinned dwarf Bushmen and the Hottentots. Skilful hunters and trackers, the Bushmen have marvellous powers of endurance and will follow a wounded giraffe, gazelle, or leopard for miles until finally exhausted it falls a prey to their bows and arrows. They have no permanent homes but build rough shelters, or take refuge under bushes or in caves. Their language consists of a series of clicks

made by the tongue. The Hottentots, somewhat more advanced than the Bushmen, are, like them, few in number.

EXERCISES

1. (a) With the aid of your atlas make a list of the chief deserts in (i) the Southern Hemisphere, and (ii) the Northern Hemisphere.
(b) What tropic crosses (i) the Sahara and (ii) the Kalahari desert?
2. Compare the life led by the people living in the oases of the Sahara with that of the nomadic folk.
3. Describe a journey *either* by camel caravan, *or* motor, *or* aeroplane from Colomb-Bechar (Algeria) to Gao, on the Niger.

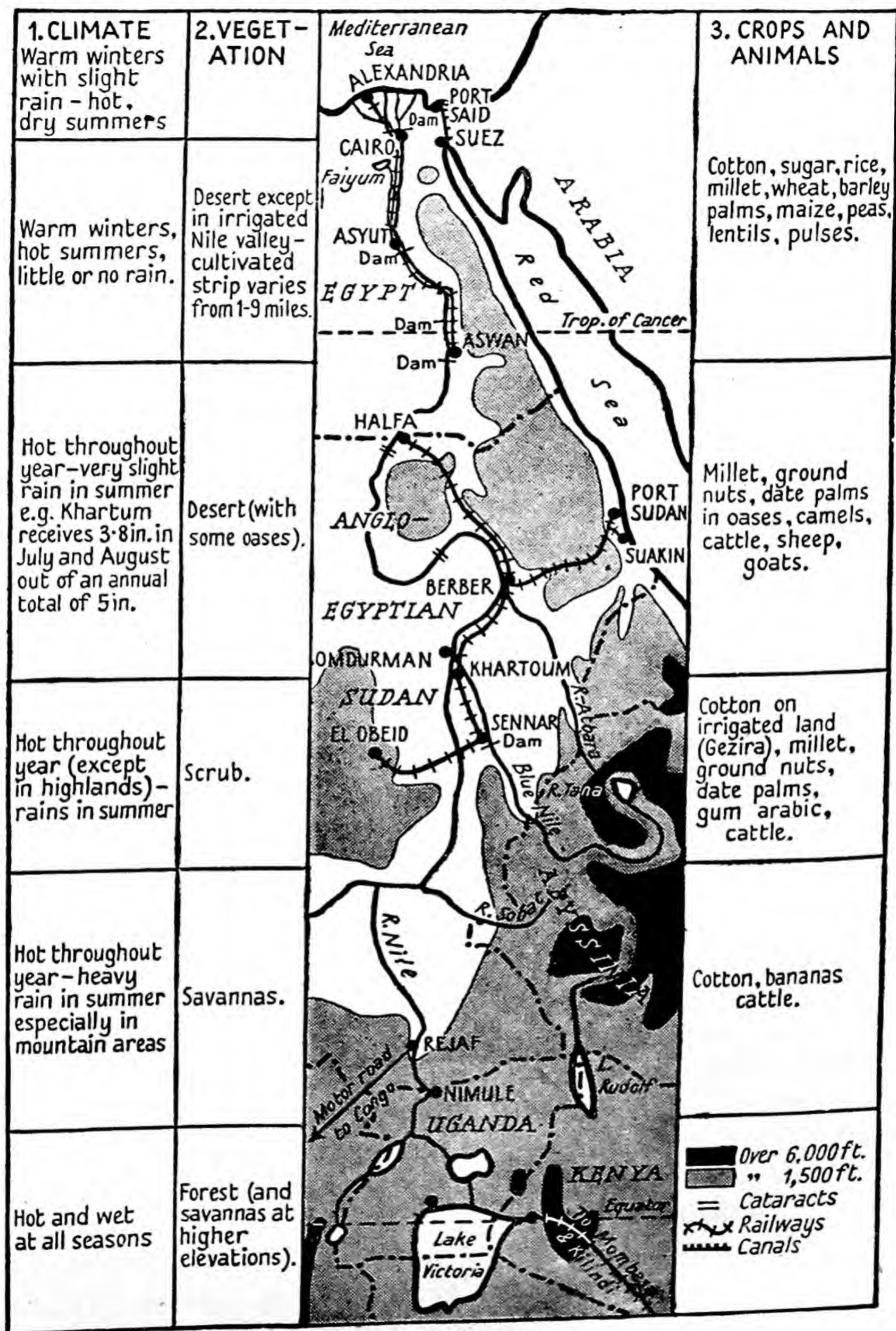


FIG. 13. The Nile

CHAPTER VI THE NILE LANDS

The Nile

THERE is no river quite like the Nile, the third longest and one of the most interesting streams in the world. It is 4,000 miles in length, but in the last 1,700 miles of its course it receives no tributaries. Yet its waters alone make possible that irrigation upon which the prosperity of Egypt depends.

Flowing out of Lake Victoria, the Nile tumbles over the Ripon Falls and speeds over numerous rapids, to the northern end of Lake Albert. In this upper portion of its course the river maintains a constant flow throughout the year, being fed by the heavy equatorial rains stored in the natural reservoirs of the great lakes.

On leaving Lake Albert the Nile is navigable as far as Nimule, on the frontier of Uganda and the Anglo-Egyptian Sudan. Beyond this town rapids prevent the passage of river-craft, and the northward journey must be made by the motor-road that runs for about 100 miles to Rejaf, where it is joined by another road, completed in 1935, coming from Stanleyville on the Congo. At Rejaf the traveller embarks on a river-steamer bound for Khartoum. In this part of its course the Nile flows through a swampy region, sometimes expanding into lakes and sometimes dividing into a number of channels. Masses of floating vegetation called *sudd* often block the main stream and its tributaries. Sometimes the latter are dammed up by the *sudd*, forming temporary lakes, called *raft lakes*, which, however, soon dry up owing to the great evaporation. The steamer pushes its way onwards between marshes where papyrus, lilies, and other water-plants grow in rich profusion; where crocodiles bask on the mud-banks and hippopotami wallow in the mud.

After receiving the Bahr-el-Ghazal, on the left bank, the

Nile turns east. But beyond its confluence with the Sobat, which descends from the Abyssinian Highlands, the river resumes its northerly course. The rainfall grows steadily less and the savannas, stretching beyond the low-lying banks, gradually merge into the scrub belt which forms the transitional zone between the hot grasslands and the desert. Nine days after leaving Rejaf the steamer reaches Khartoum.

At Khartoum, the Blue Nile, which flows out of Lake Tana, high up in the Abyssinian Plateau, enters the main stream. At Berber the Atbara—also descending from the Abyssinian Plateau—joins the river. Beyond this point the Nile receives no tributaries, and for 1,700 miles flows through an almost rainless region, where it has cut a valley, margined by cliffs rising in some cases to over 1,000 feet, beyond which stretch the orange sands and flat-topped rocks of the desert.

The heavy summer rains of Abyssinia cause the Sobat, the Blue Nile, and the Atbara to rise rapidly, and rushing down the steep mountain slopes they pour their mud-laden waters into the Nile. These Abyssinian affluents begin to rise in June and their flood-water reaches Aswan, in Egypt, about mid-September, and Cairo a month later. In Egypt there is a difference of from 30 to 50 feet between high- and low-water levels. So great indeed is the amount of water brought down by the Blue Nile that it actually dams back, for a time, the waters of the main stream, which do not reach Egypt until the winter season, when they help to preserve the flow of the Nile after the main flood-waters have subsided.

Between Khartoum and Aswan, navigation on the Nile is interrupted by a series of six rapids, called cataracts, where the river rushes over beds of hard resistant rock. Below Aswan the Nile valley grows still narrower, being bordered on both sides by the edges of the plateau which form precipitous sandstone cliffs from 2 to 15 miles apart.

At Cairo the Nile enters the great delta it has built up at its mouth. When a river reaches the sea its current is checked, and so it deposits some of the sediment it carries, thus gradually building up an island which, owing to its resemblance to the Greek letter Δ , is called a delta. In addition to the sediment deposited by the river, floating vegetation and drift brought by currents aid in building up the delta, across which in the course of time the river cuts *distributaries* to allow its waters to reach the sea. Deltas are common in seas like the Mediterranean, where there is little tide to scour out the mouths of the rivers and carry their sediment away instead of allowing it to settle.

The Anglo-Egyptian Sudan

The Anglo-Egyptian Sudan, which has an area of nearly a million square miles and a population of about six millions, is governed jointly by Britain and Egypt.

The central portion of the Anglo-Egyptian Sudan forms part of the great savanna belt stretching from the Abyssinian Highlands to the Atlantic, and lying between the Sahara Desert on the north and the equatorial forests on the south. The whole of this belt forms the actual *Sudan*, a word meaning 'the Land of the Blacks', so called because of its indigenous negro population.

Since the Anglo-Egyptian Sudan extends from latitude 5° N. to about latitude 20° N., a distance of approximately a thousand miles (15×70), it passes from the forested equatorial region of the south, through the savanna belt, into the desert and arid area of the north. Hence the mode of life of the people differs according to the climate and natural vegetation of the region in which they live. The differences due to environment are increased by the fact that the inhabitants of the south are mainly pagan negroes, while those of the north are Mohammedan Arabs.

The Equatorial Region, hot and wet throughout the year, is forested but passes into savannas at higher elevations.

Useful trees include mahogany and the shea-butter tree. The nuts from a species of palm yield vegetable ivory, and true ivory is got from the tusks of elephants and other animals. Gum arabic, used in the manufacture of confectionery and stationery, is obtained by tapping certain types of acacias growing in the southern forests and savannas. The people, once the prey of Arab slave-dealers, but now free to live a life suited to their environment, devote their energies to hunting and cattle-keeping, while those near the rivers are also fishers. Owing to its distance from the seaboard, and to its scanty and backward population, the development of the Southern Sudan must, of necessity, be slow.

The Savannas of the true Sudan have a hot wet season and a somewhat cooler dry season. In the cooler north the people keep vast herds of cattle and sheep. These furnish hides and wool, though some cattle are bred for beef and exported to Egypt, either through Port Sudan and thence by the Red Sea, or by river and rail. Millet, a cereal which can be grown in districts too dry for wheat, is the staple food crop. Ground-nuts, which also do well in hot dry regions, are cultivated as a cash crop for export.

But for crops that require plenty of water, irrigation is essential, mainly because of the seasonal nature of the rainfall, and partly because it is occasionally unreliable. The area available for such crops is, therefore, limited to land within reach of the Nile or its tributaries. Chief among them is cotton, the principal cash crop, whose value exceeds that of all other exports combined. It is grown on irrigated lands round Kassala, but by far the most important producing area is the *Gezira*, the district lying between the White Nile and the Blue Nile. The building of the Makwar Dam, near Sennar, on the Blue Nile, enabled the Government, in 1925, to put into operation a vast irrigation project by which an area little better than a desert has been converted into cultivated land planted with thousands of acres

of cotton. At the present time a district as large as Oxfordshire is covered by a network of canals whose total length exceeds 10,000 miles. The larger channels were constructed by the Government, but the smaller canals and roads, and the factories where the cotton is ginned, were the work of a British Company. The Company, which has the general supervision of this cotton-growing area, deals with the business side and the marketing of the crop. But the actual cultivation is done by tenant farmers who have a direct interest in the production of the cotton—an interesting example of co-operation. The bulk of the crop is exported, through Port Sudan, on the Red Sea, whence much finds its way to Lancashire.

In the *Scrub and Desert Region* north of the grasslands, crops include dates, grown in the oases, and millet used both for human consumption and for feeding cattle and poultry. Camels, even more important than cattle, are bred both for export and transport. Unlike the oasis-folk, the Arab herdsmen are nomads, dwelling in tents, and following seasonal routes. To them the herding and breeding of animals is a congenial as well as a suitable occupation, and one that produces a brave and hardy type of men. Their wants are simple, their virtues many, and they lead a patriarchal life under their Nazirs, or headmen, whose authority is recognized by the Government.

Gold is mined in the Red Sea Hills; and near Port Sudan are salt-pans, which supply the needs of the country and provide a surplus for export.

Communications and Transport. The capital and seat of the Government is *Khartoum*, which stands at the point where the Blue Nile enters the main stream. A few miles below, on the opposite bank of the White Nile, is *Omdurman*, the old Dervish capital and largest town in the country. The Nile is the chief highway, but trade is also conducted by camel caravan, and the railways carry a considerable volume of traffic. From *Wadi Halfa*, the rail-head on the

Egyptian frontier, the line passes through *Berber* and *Atbara* (the junction for Kassala and Port Sudan) to Khartoum. It then runs up the Blue Nile Valley to *Makwar*, whence it turns west for El Obeid, on the edge of the Sahara. *Port Sudan* on the Red Sea has replaced the older port of Suakin, whose harbour is of little use owing to the growth of a coral reef. Liners of the *British Overseas Airways*, on the London to Durban route, call at Wadi Halfa and Khartoum.

Egypt

The history of Egypt goes back for thousands of years; yet at the southern entrance to this land the first thing of surpassing interest is not some ancient temple or tomb, but the great dam at Aswan, $1\frac{1}{4}$ miles long, which enables flood-water to be stored for irrigating Upper Egypt, as the valley-region above the Delta is called. This wonderful engineering feat brings home to the observer, as perhaps nothing else could do, the truth of the saying, 'The Nile is Egypt and Egypt is the Nile'. It makes him realize that, but for the life-giving waters of the great river, the rainless land of Egypt, if it existed at all, would be merely part of the Sahara. Owing to the warm climate plant growth is possible throughout the year, and it is water-supply rather than temperature that controls crop production. Hence, though Egypt is more than four times the size of the British Isles, the settled and cultivated portion, confined to the irrigated lands of the Valley and the Delta, has an area scarcely twice that of Wales. Yet in this restricted region live fourteen million people, with a density of over 1,000 to the square mile.

When, about the middle of September, the flood-waters begin to rise at Aswan, the sluices in the dam are opened, as otherwise their sediment would silt up the basin above. But as the floods subside the sluices are closed and the water rises above the dam, where it is stored for use in the

canals of Upper Egypt during the low-water season. By means of canals, banked up so that they flow at a somewhat higher level than the surrounding land, the water is conducted to the fields as needed.

Dams for irrigation purposes were first constructed in the earlier part of the nineteenth century when the British came to Egypt. The dam at Aswan is the greatest on the Nile. The first one was built a little below Cairo, to store water for irrigating the delta. There are also dams or barrages at such places as Asyut, Esna, and Girga, and others are under construction. By holding up the flood-waters behind the dams until they are required, the fields can be irrigated and planted not only during the *flood season* and the succeeding cool *winter season*, but also in the hot *summer season*, when warmth-loving crops like cotton, rice, and sugar-cane, are grown. Of these, cotton supplies 80 per cent. of the total exports of Egypt, the greater part being sent to Lancashire where it is much in demand on account of its excellent quality.

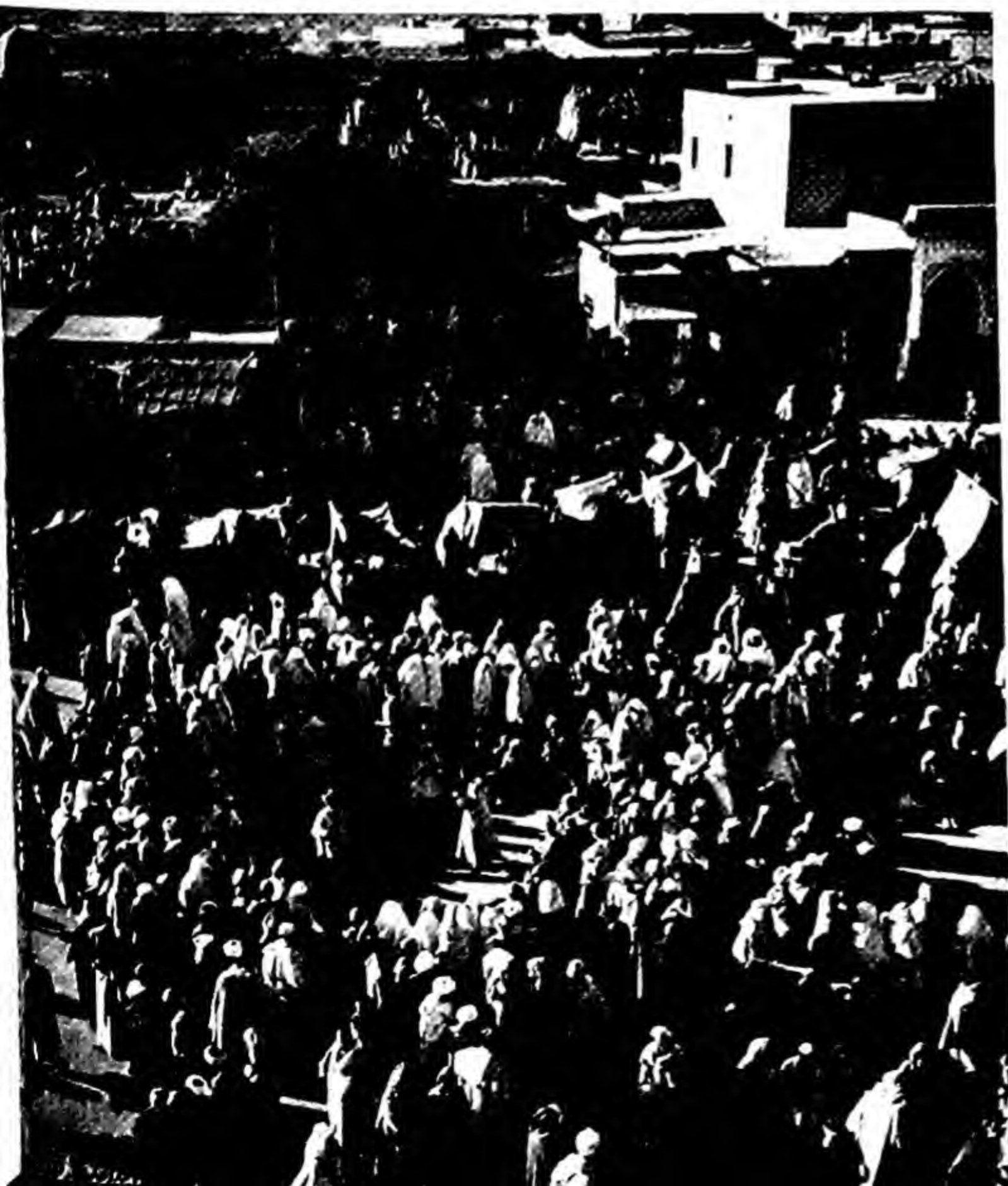
One of the disadvantages of *perennial irrigation*, as it is called, is that the dams hold back much of the fertilizing Nile silt, which was formerly spread over the land during the flood season, when the river is from 30 to 50 feet above its low-water level.

Irrigation has, of course, been carried out in Egypt from time immemorial. The older *basin method* is still widely used, especially in Upper Egypt *above* the Aswan dam. When the floods begin to rise, the water is admitted through canals to embanked fields where it remains for two months or so, until the soil is thoroughly moistened and covered with thick silt. After the waters subside the crops are sown in the wet soil. In the higher fields from which the waters drain off first, the time before the cool winter season is long enough to allow quickly growing crops, like millet and maize, to ripen. More usual, however, are winter wheat and barley—both of which ripen towards the end of April—

pulses, lentils, and fodder crops such as clover. The last-named provides food for horses, donkeys, mules, and for water-buffaloes used for ploughing the fields in Lower Egypt (the Delta). When the crops have been harvested the land is left fallow, becoming dry and cracked until the next flood season. The cultivated lands extend for several miles on each side of the Nile, and then cease quite suddenly towards the edge of the valley, beyond which spreads the desert.

In some districts in Upper Egypt, notably on sugar plantations owned by companies, water is raised from the canals by powerful pumps. But these are expensive to install, and the *fellahin* (peasants) employ more primitive and less costly methods for irrigating their plots. Here, for instance, a water-buffalo walks round and round turning a creaking water-wheel. And there the *fellahin* are working *shadufs*, which, like their wooden ploughs, differ little from those used in the time of the Pharaohs. As will be seen from the picture (Plate 2) the *shaduf* consists of a long tapering pole, to the thinner end of which an earthenware jar is fastened, and to the thicker end a heavy weight. The jar is dipped into the water and raised by means of the counterweight. This is laborious work, but so skilled are the peasants that each operation is completed in little more than a second.

Most Egyptians depend on agriculture for their livelihood. But, owing to the dense population, the farms are of necessity small. Few exceed an acre in extent, and the produce of each has to support an entire family. Hence many of the *fellahin* are poverty-stricken. The majority live in river-side villages, set amidst lofty palms, the flat-roofed houses being grouped around a mosque, or, if the people are Copts (Egyptian Christians), around a church. The grey motor omnibuses that link each village with its neighbour present a strange contrast to the laden camels, donkeys, and mules, pacing along the roads. So do the



3. ALEXANDRIA AND MARRAKESH (MOROCCO)

The aerial view (*above*) gives a splendid idea of Alexandria, Egypt's chief port (see p. 55). Below is seen Marrakesh, the great caravan centre in Morocco. Note the flowing dress of the Arabs, the market booths, and the awnings in front of the flat-roofed, white-walled buildings. The dome of the mosque, seen in the left background, reminds us that these people are adherents of Islam (see pp. 5 and 34).



4. WEST AFRICAN SCENES

(Above) A Cocoa farmer's compound in the Gold Coast. Even the youngsters are helping to spread out the beans, which will be left to dry in the sun until they are ready to be bagged for export (see p. 60). (Below) Harvesting ground-nuts in Northern Nigeria. After the plants have been pulled up by their roots they are stacked to dry, and then the pods, containing the nuts, are detached from the stem (see p. 65).

flat-bottomed Nile steamers when compared with the *feluccas*, which rely on the prevailing north and north-east winds to fill their tall white sails as they travel up the Nile, but depend on their oars and the current when returning downstream.

Cairo, the capital, a city with over a million inhabitants, stands at the head of the Delta and so controls routes between Lower and Upper Egypt. It still has an old quarter with picturesque bazaars, ramshackle shops, and a labyrinth of narrow lanes. But this is rapidly being replaced by broad thoroughfares, lined with blocks of business buildings and flats, very like those in a European city. Yet life in the streets still speaks of the Orient. Egyptians, Arabs, negroes, and Europeans throng the narrow pavements and overflow into the carriageways, where taxicabs and cyclists pay little attention to the rule of the road; crowded omnibuses edge their way past tramcars; and the drivers of lumbering country carts, devoid of sides, urge their donkeys forward with shrill cries, and shout to the pedestrians, who press around, to make way.

On the opposite side of the Nile are the Great Pyramids and the Sphinx, the most famous monuments in a land whose past is written in stones, and whose present is characterized by the endeavour of its people to be worthy of their status as an independent nation.

From Cairo railways run up the Nile valley to Aswan, east to Port Said and Suez, and across the Delta to Alexandria.

Through *Alexandria* (682,000), the second city in Egypt, is exported the entire cotton crop, as well as sugar, grain, and rice (Plate 3). Cosmopolitan *Port Said*, at the Mediterranean Sea end of the Suez Canal, the third largest town, has a population of 100,000.

EXERCISES

1. (a) What is the chief cause of the Nile floods? (b) At what time of the year is the Nile highest at (i) Aswan, and (ii) Cairo? (c) What is the approximate difference in level between the flood level and the low-water level of the Nile in Egypt?

2. (a) Name *four* places in Egypt and *one* in the Anglo-Egyptian Sudan where dams or barrages have been built. (b) Name *three* methods of irrigation practised in Egypt, and describe *one* of the more important ones. (c) Name the chief crops grown in Egypt during (i) the flood, (ii) the winter, and (iii) the hot season. (d) Of these crops, which do you consider the most important? Why?

3. Into what three regions would you divide the Anglo-Egyptian Sudan? Write an account of the climate and crops of *one* of them.

4. Name *three* ways in which the life of an Egyptian peasant differs from that of a negro living in the south of the Sudan. Account for the differences.

CHAPTER VII

THE GUINEA LANDS

Forests and Savannas

MOST of the lands fronting the Gulf of Guinea are governed by the British and French, though the Spanish and Portuguese each have a colony in this region and there is an independent negro republic—Liberia. The British colonies of Nigeria and the Gold Coast are the most important countries.

From the low plain fringing the Gulf of Guinea the land rises sharply to the plateau, which reaches its greatest height in the Futa Jallon Highlands in the west. Here rise the Niger, the Senegal, and the Gambia. Like other African streams, the rivers descend from the plateau to the lowlands by falls and rapids up to which points most of them are navigable. The Niger, which is the only really great river, follows a roughly semicircular course covering 2,600 miles before it enters the Gulf of Guinea. Launches can ascend the Niger to Lafiagi (150 miles up-stream from Lokoja) above which rapids prevent navigation for a considerable distance. On the middle Niger traffic is carried on by means of large steel canoes. The Benue, which enters the Niger at Lokoja, is navigable during the rainy season as far as Ibi, 300 miles below Yola, near the frontier of the Belgian Congo.

The climate of the Guinea Lands is hot and the range of temperature, as in other tropical regions, small. The coastlands and the windward slopes of the plateau receive rain throughout most of the year; it usually falls during thunder-storms that occur every day between noon and midnight. The plateau—like other savanna regions—has summer rains. From October to January, when the 'heat equator' moves south with the apparent movements of the

Sun, a dry dust-laden east or north-east wind, called the Harmattan, blows from the Sahara towards the savannas. Sometimes in January and February its effect is felt as far south as the coast of the Gulf of Guinea where, owing to its dryness, it provides such welcome relief from the steamy heat of the lowlands that it is known as 'the doctor'.

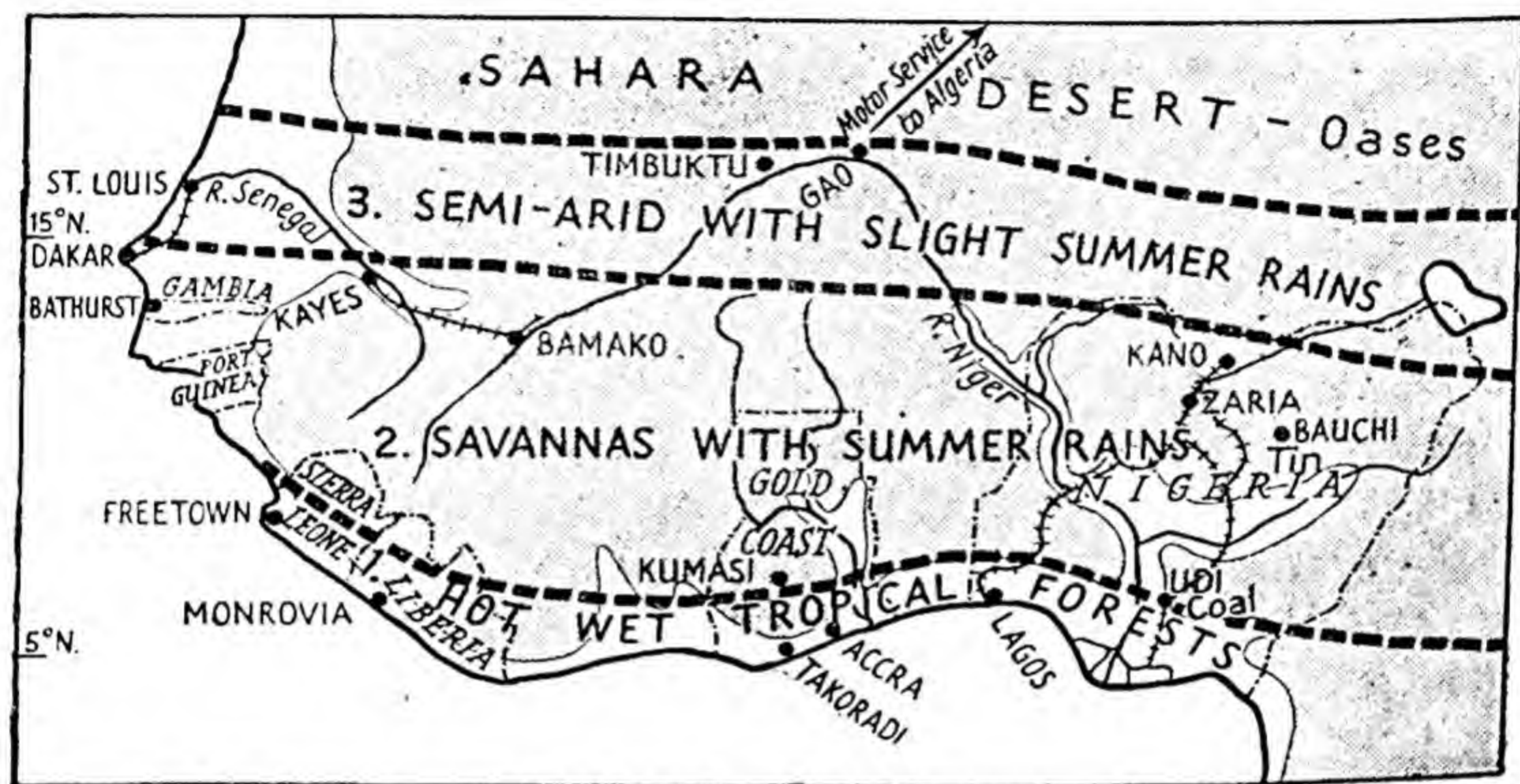


FIG. 14. Tropical West Africa: Natural Regions

We may divide the Guinea Lands into two Natural Regions: (1) the Coast-lands, and (2) the Plateau.

The Coast-lands

Picture a low sandy coast on which the rollers break in clouds of surf; a coast with practically no good natural harbours, fringed in places with unhealthy mangrove swamps, and backed by dense forests whose luxuriant vegetation tells of great heat and constant rain. At most smaller ports, steamers are obliged to anchor some distance from the shore, and passengers are landed in surf-boats which shoot through the waves until they reach shallow water where the surf breaks upon the sandy strand. Goods, too, must be shipped in this uncertain way, and many tons of merchandise and machinery are consequently lost in the sea.

Names like the Grain Coast (spice grains), the Ivory Coast, the Gold Coast (alluvial gold), and the Slave Coast tell of the former products of this region; but they have little more than an historic interest. To-day the chief importance of the Guinea Lands lies in the fact that they supply tropical products needed by people living in the temperate zone, especially in Europe and North America. Chief among these products are palm-oil, palm-kernels, and cacao. As the oil-palm requires great heat and moisture it is only found within 10° of the Equator. It is indigenous to West Africa, the largest producer of palm-oil in the world, Nigeria alone accounting for more than half the output.

Almost half the world's cacao comes from the Gold Coast, and it is also cultivated in Nigeria. These two colonies also export mahogany and other tropical timbers.

Oil-palms. A journey of less than 10 miles from the Nigerian port of Lagos would bring us into the heart of the oil-palm belt, where the trees range from youngsters a few feet high, and six-year-old trees just beginning to bear, to full-grown palms whose feathery tufts rise 50 or 60 feet above the ground. Mature trees yield, as a rule, four or five bunches a year; each bunch bears from 600 to 1,000 fruits, and weighs from 30 to 100 lb. The fruits resemble small plums: the outside is fleshy; inside is a hard nut, and inside the nut again is a relatively small kernel. The outer flesh, when boiled, yields palm-oil, and the kernel the more valuable palm-kernel oil. The Africans use palm-oil in place of butter. Palm-oil, palm-kernels, and palm-kernel oil are exported to Britain, France, and other countries, where they are used in the manufacture of soap and margarine. Palm-oil is also used in tin-plate factories, like those at Swansea, South Wales, for making a film over the sheet-iron before it is coated with tin. Containers for holding preserved foods, petrol, &c., are made from tin-plate.

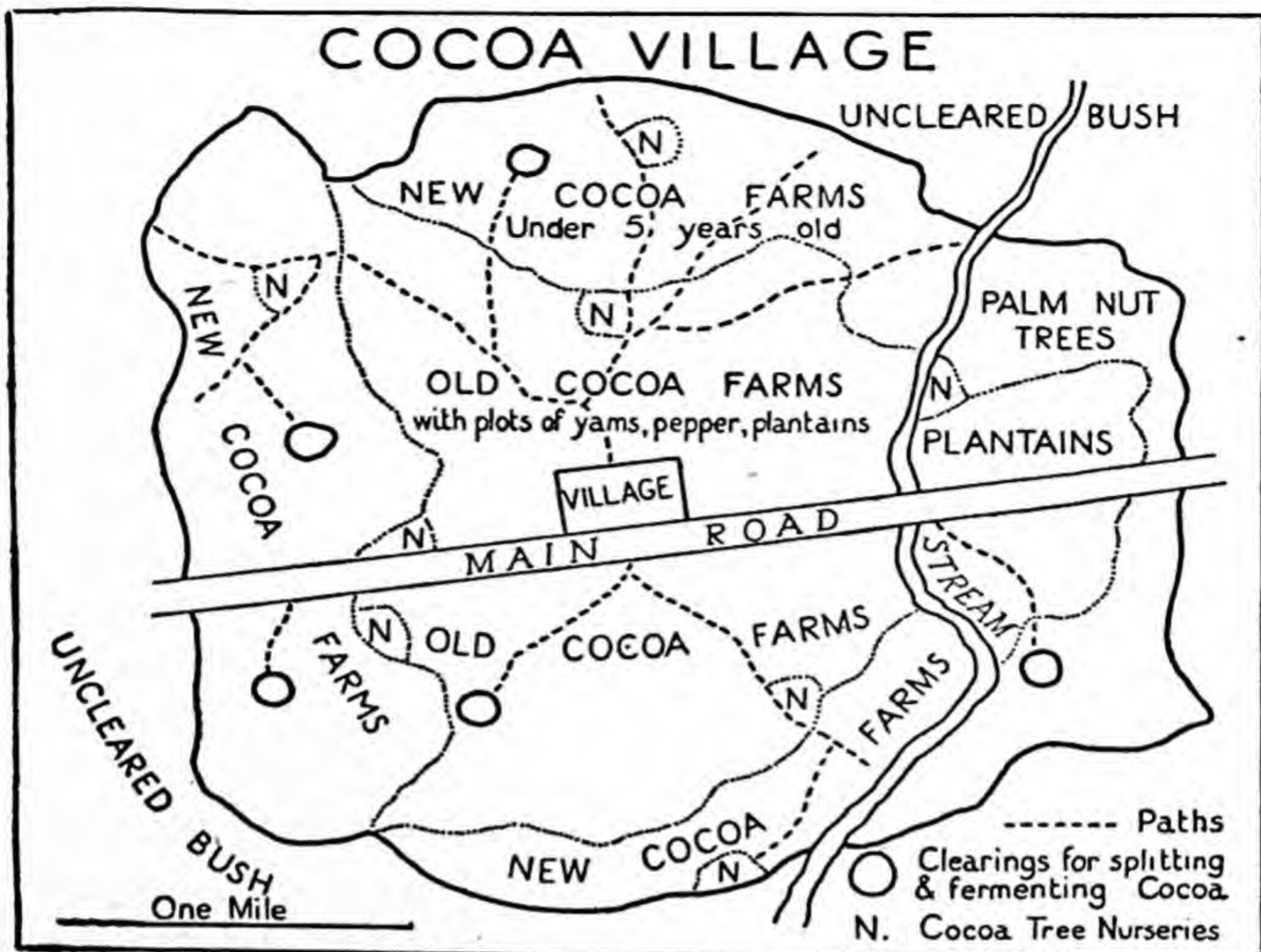
Cacao. The rise of the cacao or cocoa industry in the Gold Coast reads like a romance: in 1878 there was not a

single tree in the country, to-day there are over 180,000,000. Practically all the cacao is grown by native farmers, who have found it so profitable that many have almost given up cultivating food crops. As the trees require great heat and moisture they can only be grown within 20° of the Equator. They are from 20 to 30 feet high, and need protection from the winds: and some of the finest plantations are found on the sheltered slopes of valleys a few hundred feet above sea-level. The flowers spring from 'cushions' on the main trunk and the branches. Flowers as well as young and fully grown pods may be seen on the trees at the same time. Each yellowish pod contains from twenty to forty red beans embedded in a white pulp. The beans are usually dried in the sun (Plate 12), and on some plantations the drying platforms are fitted with sliding roofs which afford cover when it rains. The dried beans are packed in bags. Formerly these bags were carried to the railway on the heads of negro porters: now, however, thanks to the building of roads, they are transported by motor lorries. Great quantities are exported to England, where the beans are manufactured into cocoa and chocolate at Bournville (Birmingham), Bristol, and York.

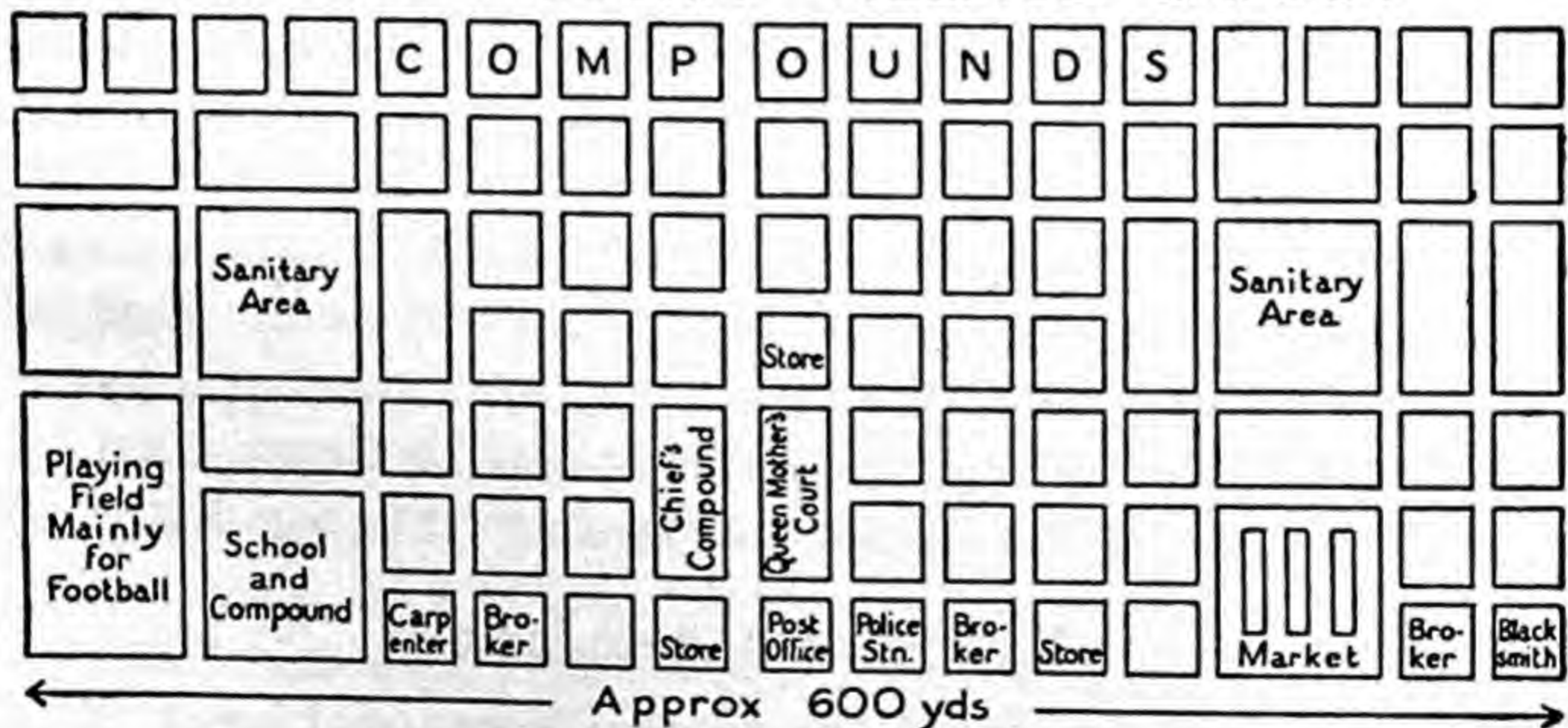
Maize thrives in the coastal belt. In the Gold Coast and Nigeria it is, however, only grown for food, as the farmers find it more profitable to produce cash crops, such as cacao, which command higher prices in world markets. On the other hand, in the French colonies maize is cultivated for export as well as for home consumption.

The Plateau—Mixed Farming and 'Shifting Cultivation'

In the south the Highlands form part of the savanna region of the Sudan. But towards the north, as the rainy season grows shorter, the richer grasslands merge into poorer pastures which, in their turn, pass into the thorn-wood belt margining the Sahara.



TYPICAL MODERN VILLAGE LAYOUT



PLAN OF COMPOUND OF A COCOA (CACAO) FARMER AND BROKER



K Kitchen.
W.R. Washing Rooms
F. Fowls
•• Open Fireplaces

FIG. 15. Plan of a Cocoa Village. (By courtesy of Messrs. Cadbury)

Unlike the people of the forest region, who are unable to keep domestic animals because of the tsetse fly, many of the savanna folk are herdsmen, an occupation well suited to their environment. They graze horned cattle, sheep, and goats, but as they are concerned with numbers rather than quality, the animals are bred mainly for hides. The Fulani (see p. 12), however, are an exception, being skilful cattle-breeders. Poultry are raised both as food and for use in magical rites. Most tribes practise mixed farming, combining stock-rearing with agriculture; growing ground-nuts and cotton as cash crops, and millet as their staple food crop. The millet is made into a kind of porridge, a diet which is supplemented by edible roots, fruit, honey, and wild game, all of which are plentiful in the African bush.

The hoe and the axe are the almost universal agricultural implements among the native peoples of tropical Africa. Land is cleared for cultivation by felling and burning the bush, whose ash enriches the soil. But as manure is seldom used, the ground becomes exhausted in two years, so that fresh plots have to be cleared. This 'shifting cultivation', though wasteful and causing soil erosion, is practised throughout the wooded areas of Africa. In districts where villages are removed as soon as all suitable land has been cleared, the huts are little more than shelters. But where people dwell in permanent villages, and their garden plots are some distance away, they move out to them, and live in temporary huts from seed-time to harvest (see Plate 2).

British Possessions

Nigeria is about four times the size of Great Britain. With twenty-one million inhabitants, it has, except for India, a greater population than any other overseas state in the British Empire. The country is divided into the forest region of Southern Nigeria and the higher healthier savannas of Northern Nigeria.

From *Lagos* (167,000), the port-capital, the railway strikes

through the heart of the forest belt to *Ibadan*, a city with 318,000 inhabitants. Unlike the more primitive folk living in the remoter parts of the forests, the people in cities, such as *Ibadan*, are skilled craftsmen. Many weave cotton cloths on hand-loom, while others are dyers, potters, and metal-workers.

At *Jebba* the railway crosses the Niger and enters Northern Nigeria. Travelling north-east across the savannas, we pass by walled towns and villages, surrounded by fields and pasture lands, to Kaduna and *Zaria*. From Kaduna a line runs east to the granite Bauchi Plateau, noted for its *tin* mines. Southward from the Bauchi district, this railway runs through the *coal*-mining centre of Udi, in Southern Nigeria, to Port Harcourt, west of the Niger delta.

From *Zaria* the line runs through Kano to Nigura. *Kano*, a walled city, is still one of the great trading and caravan centres of the Central Sudan. Along the roads leading to Kano moves a constant stream of animals carrying cotton, ground-nuts, hides, and skins. Camels, donkeys, horses, and even oxen pace in close procession, guided by Arab, negro, or Hausa attendants. Some are dressed in brilliant robes and travel astride fine steeds; others wear few clothes; but all carry weapons, not for defence against lawless raiders but for protection from wild animals. The markets of Kano are thronged with merchants from far and near. Some have come to buy or sell salt, dates, pottery, leather-work, and carpets; many are traders in cotton and native cotton goods, as well as ground-nuts, for which the city is an important collecting and forwarding centre.

Half a century ago Kano was the chief slave-market in the Central Sudan. But British rule has brought peace to a country once stricken with tribal wars in which the defeated were enslaved by the victors. The people are ruled by chiefs aided by British advisers. Railways and roads have been built; air lines are being developed; and Public Health and Educational Services established. There are no

large plantations controlled and supervised by Europeans, as in the Belgian Congo, but the Nigerians own and work their farms. In these ways the country is being developed for the good of its inhabitants instead of being exploited mainly for commercial gain.

The Gold Coast, whose area is approximately equal to that of England and Wales, has a population approaching some four millions. Vast tracts of forest have, of course, been cleared for cacao plantations, but other areas yield mahogany and other hardwoods, as well as kola-nuts from which a powerful drink is made. Apart from the magnificent deep-water harbour at *Takoradi*, which has displaced Sekondi, the chief port is *Accra*, where, however, goods have still to be shipped on board steamers by surf-boats. *Kumasi*, the principal inland town, is linked by rail with the ports. The Volta, the main river, is an important highway. Alluvial gold and cacao are the chief exports.

The colony and protectorate of *Sierra Leone* has a population of about 1,800,000. *Freetown*, the capital, on the finest natural harbour in West Africa, was founded as a home for freed negro slaves. Rice, yams, and bananas are the chief food-crops. The main exports are iron ore, kola nuts, palm-kernels, and ginger.

Gambia. The colony and protectorate of Gambia lies around the Gambia river from which it takes its name. Unlike the other West African colonies, it lies almost wholly in the savanna belt. From May to November, during the rainy season, there is little traffic on the Gambia river, but from November onwards the broad stream is alive with boats, most of them carrying recently harvested ground-nuts, the chief product of the grasslands. *Ground-nuts* yield a pale yellow oil used in the manufacture of margarine and salad oils. The plant, which is from a foot to 18 inches high, has small oval leaves, set in pairs, and bright yellow flowers resembling those of broom. As the petals fall away, the pods, at the bottom of the stem, embed themselves in

the ground where they ripen. At harvest time the withered plants are pulled up and stacked to dry. Each pod contains two reddish nuts; these are stripped from the stems, bagged and 'headed' to some nearby village, from which they are sent for export to *Bathurst*, the port-capital, linked by air with Natal (Brazil), Freetown, and Lagos.

French Possessions

Most of the *Senegal*, which like *Gambia* takes its name from a river, lies in the savanna belt. Rice and maize are the chief food crops. St. Louis, the capital, at the mouth of the Senegal, is connected by rail with the superior port of Dakar. From the latter town, an airport on the France-South American route, a railway runs to Kayes on the Upper Senegal, and thence to Bamako, on the Niger. Small steamers can ascend the Senegal as far as Kayes during the rainy season. The *Ivory Coast* exports cacao, palm-oil, and kernels. The former German colony of the Cameroons and French Congo is now included in *French Equatorial Africa*, a region as yet little developed.

EXERCISES

1. Draw a sketch-map of West Africa. On it shade the high land. Mark and name the Niger and its chief tributary, and the Senegal and the Gambia rivers. Indicate and name the chief Natural Regions. Print *Forests* and *Savannas* over the appropriate areas.

2. (a) What do you mean by a *cash crop*? Name two of the chief cash crops grown in West Africa, and in each case name *one* important area of production. (b) For *one* of these products describe the conditions under which it is cultivated.

3. *Either* describe (a) a voyage from Bathurst to Port Harcourt calling only at British ports; *or* (b) a journey by air from Bathurst (via Freetown, Lagos, and Kaduna) to Kano.

4. Write an account of Northern Nigeria under the following headings: (a) relief and climate; (b) chief products and occupations of the people; (c) chief towns; and (d) routes from the coast.

CHAPTER VIII

THE CONGO BASIN

The Ever-growing Forests

THE greater part of this basin lies within the Belgian Congo, a state whose area is almost eighty times that of Belgium itself. The Congo Basin is a circular, plain-like table-land, 1,500 feet above the sea, surrounded on all sides by the edges of higher plateaux. The configuration of this cup-like depression, and the sandstone and other sedimentary rocks which cover most of the older strata, show that the basin was once probably occupied by an inland sea.

From its source, south of Lake Tanganyika, the Congo flows south through Lake Bangweulu and thence northward through Lake Mweru. After receiving the Lukuga, the outlet for Lake Tanganyika during exceptionally rainy seasons, the river leaves the higher part of the plateau by a series of rapids. Continuing northward, it crosses the Equator at Stanley Falls where it descends to the lower portion of its basin. Flowing west, and then south-west, it again crosses the Equator, shortly afterwards receiving the Ubangi, on the right bank, and farther downstream the Kasai, on the left bank. After leaving Stanley Pool the river, which drains more than a million square miles, descends to its estuary over a series of rapids that extend for some 200 miles. As the Congo Basin lies in the equatorial wet belt, the main stream carries to the Atlantic more water than all other African rivers combined.

Owing to the heat and heavy rainfall the whole basin—except more elevated and cooler regions such as the Katanga Highlands—is clad with evergreen forests, where an immense number of different species of trees, festooned with vines and creepers, and ranging from palms to woody mahoganies, rise in tiers from the impenetrable under-

growth. But owing, in part, to its greater elevation, and, in part, to the porous nature of the prevailing sandstone rock, the Congo Basin is not covered with such dense forest as that of the Amazon; and consequently is not quite so thinly peopled. In the higher areas within the forest belt itself, and on the surrounding plateau, the thick vegetation gives way to lighter woodlands and savannas. But in the lower glades the oppressive gloom never varies, for the leafy canopy above shuts out the light of a sun too often hidden by black clouds, which discharge their moisture during violent thunderstorms.

Life and Work in the Forests

In spite of the coming of the white man, who has made clearings in the forest for plantations, mines, and towns, and has cut roads and built railways, vast areas in the Congo Basin are undeveloped and considerable portions unexplored.

Primitive people, like the pygmies who have taken refuge in the less accessible parts of the forest, live by hunting, and collecting roots, fruit, honey, and birds' eggs. Other native tribes rely mainly on hunting and fishing. But the more advanced peoples practise *shifting cultivation*, burning the trees to clear and enrich the ground, which they furrow with their hoes. In their garden-plots they grow food crops, such as yams, bananas, manioc, maize, and rice, as well as coarse tobacco, and sometimes cotton. Most of them live beside the rivers in semi-permanent villages, building the framework of their huts of bamboos and other light timber and thatching them with palm leaves.

Except in the Katanga and similar highland areas the people cannot keep cattle or other stock, owing to the tsetse fly, whose bite is fatal to domestic animals, and usually to human beings, for it carries the germs of the deadly sleeping-sickness.

Some of the Bantu work on plantations and in mines.

Some live in the towns, but the majority prefer to lead simpler lives in their villages. At times, when clearing a piece of virgin forest for a new plantation, or when out on one of their long fishing expeditions, the natives work really hard, but as a rule their lives are leisurely and their work casual rather than constant. When their own simple needs are supplied they see no reason for exerting themselves, and prefer the easier tasks of collecting wild rubber and palm-nuts when they please to regular toil on the plantations, or in the copper and gold mines; or to felling timber.

Owing to the hot, damp climate, the white man cannot perform manual work, and native labour is essential. As there are on an average only twelve persons to the square mile, labour is scarce, and this, together with difficulties of transport, and the dislike of the indigenous population to steady work of any kind, makes the development of the Congo Basin difficult.

In the case of lumbering further difficulties occur. The forests contain mahogany and other valuable hardwoods, but such trees are widely scattered amidst relatively useless timber, and it is not worth while to fell them unless they are close to a navigable waterway. Even then their buttress-like roots prevent them from being cut below 8 or more feet from the ground, and before felling begins a platform must be erected. And then when a tree has been cut through it may, in spite of its weight, fail to fall, so closely is it surrounded and interlocked by other trees and vegetation. When this has been cleared away and at last the giant crashes to the ground, it sometimes becomes embedded in the swampy earth and must be dug out, and left lying until a passage has been cut to the nearest waterway. Thus despite the obvious advantages of the Congo Basin, with its 6,000 miles of streams suitable for floating timber, very little hardwood timber is felled, except for local use in towns, mines, and plantations.

On the plantations, controlled by companies and managed

by white overseers, cotton, coffee, sugar-cane, and cacao are grown. A relatively small amount of rubber is now obtained from the Congo Basin.

The wealth of this region at the present time lies chiefly in its gold, copper, tin, and diamond mines. Most of the

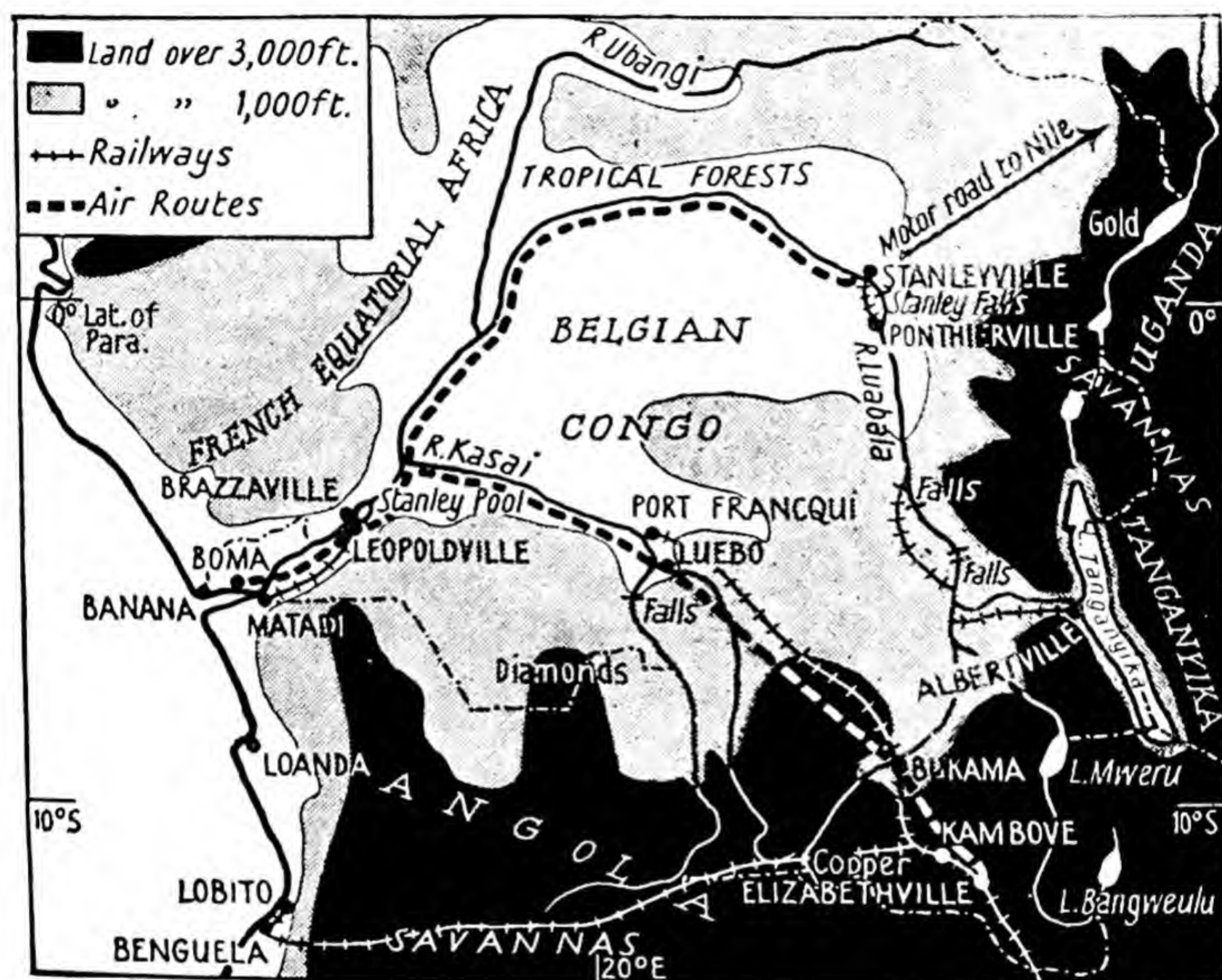


FIG. 16. The Congo Basin

gold comes from the Kilo-Moto mines in the north-east, not far from the frontier of Uganda. The chief copper-producing area is the High Katanga District in the south-east, where the Belgian Congo adjoins the British territory of Northern Rhodesia. From *Elizabethville* and *Kambove*, the principal centres, copper is dispatched by a railway running through the Portuguese territory of Angola, to Lobito, on the Atlantic. From Elizabethville trains, with dining- and sleeping-cars, run through the Rhodesias to Capetown

in five days. By this route coal, fruit, and other foodstuffs are sent northward from Northern and Southern Rhodesia to the Katanga District.

Communications

The Congo and its tributaries are the main highways of this vast region, but, as on other African rivers, navigation is interrupted by the rapids. Ocean-going steamers can travel up the estuary, past Banana, at its mouth, and Boma to *Matadi*, nearly a hundred miles from the Atlantic. Above this town the railway built to avoid the rapids runs for 226 miles to *Leopoldville*, the capital of the Belgian Congo, which stands on Stanley Pool. On the opposite side of this lake is *Brazzaville*, one of the chief towns in French Equatorial Africa. From Matadi to Leopoldville oil is pumped through a pipe-line for use in river steamers. Powerful tug-boats hauling four to eight barges of 800 tons each may be seen travelling along the 1,000-mile stretch of navigable waterway between Leopoldville and Stanleyville, at the base of Stanley Falls. A railway runs from Stanleyville to Ponthierville, above the Falls. The Congo, now known as the Lualaba, is again navigable in two stretches—separated by rapids, but linked by railways—as far as Bukama. This town, at the head of navigation, stands on the line from Elizabethville and the Katanga District to Port Francqui, on the Kasai. Bukama is connected by rail with Lobito Bay and Capetown.

In the whole of the Belgian Congo there are only 3,000 miles of railways, and 42,000 miles of roads some of which, like the highway from Stanleyville to Rejaf, on the Nile, are suitable for motor traffic at all seasons. But in proportion to its size the road mileage of this state is small. Over vast areas there are no roads or railways, and though rivers are used wherever possible, even this means of transport is not always available. Moreover, owing to the tsetse fly animals cannot be used for carrying goods. In many dis-

tracts baggage is conveyed by negro porters who carry on their heads loads of from 50 to 60 lbs. This expensive form of transport provides but another example of the difficulties encountered in developing the Congo Basin and similar regions in tropical Africa (see Plate 6).

In recent years air transport has made rapid strides. It is now possible to travel in five days from Elizabethville (via

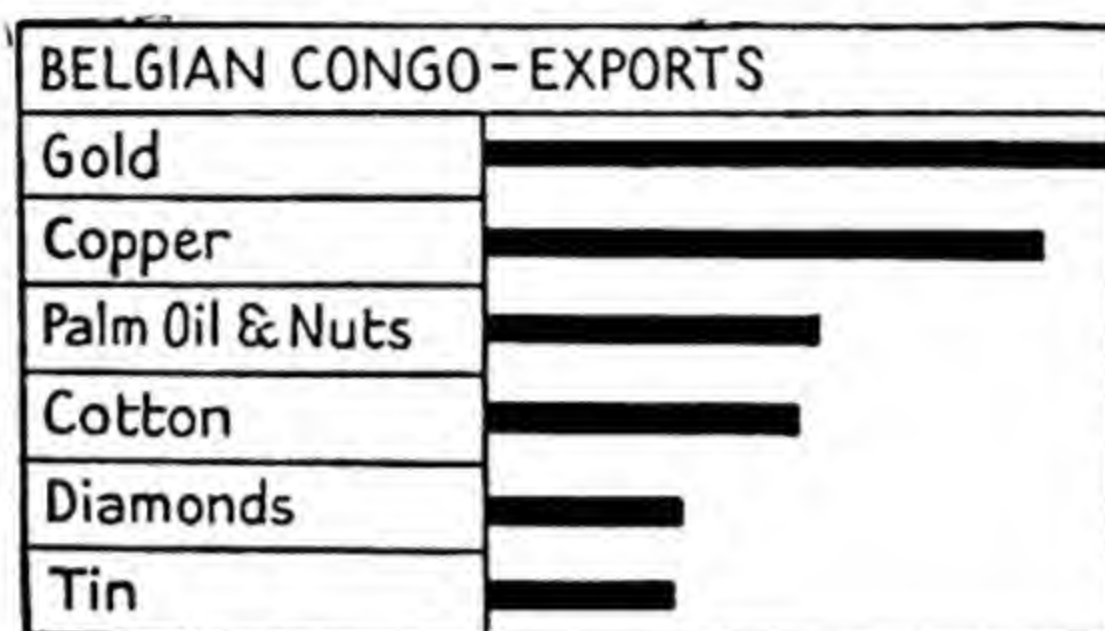


FIG. 17

Leopoldville) to Brussels, a distance of nearly 6,400 miles. Internal services, such as that from Boma and Leopoldville to Stanleyville, link the more important towns in the Belgian Congo, and there are connexions with South Africa and British East Africa.

EXERCISES

1. (a) Describe the occupations of the people living in the Congo Basin. (b) Give *two* reasons which account for the fact that the Congo Basin is more densely peopled than that of the Amazon.
2. Give an account of the various methods of transport employed in the Congo Basin.
3. (a) Name *three* plantation crops grown in the Congo Basin, and describe the conditions under which *one* is cultivated. (b) Name *four* minerals mined in this area. In the case of *one* only, describe the route by which it is dispatched to the port of export.

CHAPTER IX

AN OCEAN HIGHWAY: ABYSSINIA AND THE HORN OF AFRICA

The Way to East Africa, India, and the Far East

DOWN-CHANNEL from Southampton a vessel outward bound for East Africa crosses the Bay of Biscay, and after passing Cape Finisterre keeps well out to sea until Cape St. Vincent is sighted. Then setting a south-easterly course she makes for the Strait of Gibraltar, that strip of water only 9 miles wide which separates Europe from Africa.

Gibraltar, the 'key' to the Mediterranean, is the first British naval and fuelling station on the sea-route to India and the Far East. There mails are left, passengers land or embark, and the vessel sets off again on the 1,000-mile stretch to Malta. The ship drops anchor in the quaint old harbour of Valetta, the island's capital, but after a brief stay continues her journey.

Port Said is 940 miles distant, and here the vessel enters the *Suez Canal*. Though the canal is in Egyptian territory, it belongs to a company in which the majority of the shares are held by the British Government, who are responsible for its defence. Its importance to Britain as a vital link in her communications with India, the Far East, and Australia may be gauged from the fact that three out of every five ships and somewhat more than half the total tonnage passing through the canal are British. The canal is also much used by Dutch vessels travelling between Holland and the Dutch possessions in the East Indies, by Italian ships proceeding to and from Italian East Africa, and by French steamers. Though it cost only a quarter as much as the Panama Canal to build, the dues are as high, and many tramp steamers, plying between Europe, India, and Australia, sail by the 'Cape Route' to avoid the heavy tolls levied on shipping.

On the breakwater at Port Said stands the statue of Ferdinand de Lesseps, the famous French engineer, to whose skill this canal, linking the Mediterranean with the Red Sea, owes its existence. Begun in 1859 it was completed ten years later. It shortens the distance from England to India by over 4,000 miles, to Australia by 1,200 miles, and to East African ports by some 2,000 miles.

Her dues paid, the ship steams through the canal which for 103 miles traverses the desert. Though there are no locks, progress is slow, for otherwise the wash would damage the banks; the passage to Suez takes about 16 hours.

The Red Sea journey is always unpleasant, and the intense heat and damp air at times make it almost unbearable. This long narrow trough, which runs southward for 1,200 miles, is from 100 to 250 miles wide. On both the Arabian and African sides, steep escarpments rise from barren rocky shores. There are few ports along the inhospitable coasts. From Port Sudan, the outlet for the Anglo-Egyptian Sudan, boats crowded with Mohammedan pilgrims sail to Jidda. Southwards, on the African shore, is Massawa, the chief port of the Italian colony of Eritrea.

So through the narrow strait of Bab-el-Mandeb the vessel enters the Gulf of Aden, the arm of the Indian Ocean which stretches between the south coast of Arabia and the great projection known as 'the Horn of Africa'. French and British Somaliland lie to the west and south: the British colony and protectorate of Aden stretches along the Asiatic shore. *Aden* itself, on a magnificent harbour almost midway between Port Said and Bombay, is an important fueling station, port of call and *entrepôt* port, collecting and forwarding produce from Southern Arabia, British Somaliland, and the surrounding area.

Abyssinia and the Horn of Africa

This part of Africa may be divided into two well-defined regions:

(1) *The Coastal Lowlands*, hot and dry at all seasons, consist of poor savannas, scrub, and desert. There are no permanent rivers, but in districts where sufficient water can be obtained for irrigation a little rice and cotton are grown. The Somalis and other tribes are nomads, who are ever



FIG. 18. Abyssinia and the Horn of Africa

wandering in search of fresh pasture and water for their camels, sheep, goats, and cattle. Their exports are of no great value, but their wants are small. Livestock and hides are shipped to Aden from Berbera, the capital of *British Somaliland*, whose few imports consist of rice from India, dates from Basra, and cotton cloths from Lancashire or Japan. Jibuti, the port-capital of *French Somaliland*, is the terminus of the railway from Addis Ababa.

(2) *The Abyssinian Highlands* are a high plateau cut into blocks by canyons, like those through which the Blue Nile,

flowing out of Lake Tana, the Atbara, and the Sobat cut their way north-west to the White Nile. During the heavy summer rains these shallow streams roll down in turgid floods, carrying those life-giving waters upon which the prosperity of Egypt depends.

Some of the precipitous canyons are nearly a mile deep and from 10 to 15 miles from edge to edge. They are formidable obstacles, and travellers often take days to negotiate them. In descending these huge chasms one passes from a temperate to a tropical climate, and from wooded grasslands to unhealthy forests which, however, contain valuable trees including rubber. In the south and west of Abyssinia wild coffee-trees grow to a height of about 30 feet, but in areas where they are cultivated the trees are pruned back to 8 or 9 feet. Cotton, sugar-cane, and date-palms thrive at suitable elevations, but are not yet extensively raised.

The majority of the people live in the Highlands, where they graze thousands of cattle, sheep, and goats, and rear ponies and mules—the chief transport animals—on the rolling grasslands. Most of them till enough ground to supply their own needs. Millet is the principal crop, but maize and barley are also cultivated. Farming methods are crude. The ground is scarcely scratched with the rough wooden ploughs, drawn by a yoke of bulls or oxen, and after harvest the fields are left fallow for some years. The crops must be continually guarded against birds and animals, notably baboons, who delight in raiding them.

Almost isolated from the outside world by mountain barriers, the Abyssinians for centuries followed the traditions of their ancestors; and though adapting their mode of life to their environment did relatively little to improve it. The natural obstacles of a terrain riven with canyons hindered communication, and by favouring the rise of feudal chiefs prevented the establishment of a strong central government. Thus during the war of 1935-6 the Abyssinians, disunited, ill-armed, and ill-prepared, fell easy

victims to Italian forces, equipped with all the latest devices of modern warfare. It was from their colony of Eritrea that the invaders made their chief advance into Abyssinia, which resulted in its conquest and incorporation, with Eritrea and Italian Somaliland, in *Italian East Africa*.

Formerly most roads in Abyssinia were little more than tracks, and internal trade was carried on by means of porters, pack-horses, pack-mules, and, in some areas, by camel caravans. But the Italians are building motor-roads, for strategic purposes and to develop the agricultural resources and mineral wealth of the country, which geologists say is great.

Nearly all the people live in villages scattered over the more fertile parts of the plateau. Their huts, constructed of materials nearest to hand, are made by covering a framework of poles with wattle and daub. They have no chimneys, but holes in the conical roofs allow the smoke to escape from the wood-fires beneath. Even in the towns the houses consist mainly of wattle and thatched huts, though some are roofed with corrugated iron. *Addis Ababa*, the capital (population 150,000), stands in undulating country, at a height of 8,000 feet above sea-level. It is surrounded by eucalyptus trees, which, because of their fast-growing properties, were imported from Australia to replace indigenous acacias and junipers that had been felled by the populace for fuel. In addition to the railway to Jibuti, in French Somaliland, a number of motor-roads radiate from Addis Ababa, including one to *Asmara*, the capital of Eritrea.

EXERCISES

1. (a) Describe the relief of Abyssinia. (b) In what way did it (i) assist, and (ii) hinder the Italian conquest of Abyssinia?
2. Describe the chief occupations of the people of Abyssinia, and show how these are related to their environment.
3. An English official stationed in Berbera has six months' leave which he decides to spend in England. Describe his homeward route.
4. Draw a sketch-map to show why the Suez Canal is such an important channel of communication.

CHAPTER X

BRITISH EAST AFRICA

The East African Colonies

THE Plateau of East Central Africa, which stretches from the Abyssinian Highlands to the Zambezi, is margined by a low coastal plain fronting the Indian Ocean.

This region forms part of a belt of British territory which extends from the Anglo-Egyptian Sudan to the extreme south of Africa. British East Africa consists of the following colonies and protectorates: Kenya and Uganda, the island of Zanzibar and Pemba; Nyasaland; and the former German colony of Tanganyika now ruled by Britain, under a mandate from the League of Nations.

Lowland and Plateau

From the coastal lowlands the land rises by steep escarpments to the Great Central Plateau. Much higher than the corresponding part of the Congo Basin, this table-land has an average elevation of from 4,000 to 9,000 feet, though the extinct volcanic cones of Elgon, Kenya, and Kilimanjaro rise to heights ranging from 14,000 to nearly 20,000 feet. Further diversity is given to its surface by the two rift valleys, converging towards Lake Nyasa, which trench the plateau.

As British East Africa stretches from 5° N. to about 16° S., much of it lies in the equatorial wet belt and receives rain at all seasons, especially during the months following the period when the sun is overhead. Towards the north and south, however, the rains tend to be seasonal, most falling during the summer months. But the climate depends on differences in elevation rather than on latitude. Thus the coastal regions, the relatively low-lying district

around Lake Victoria, and the rift valleys are hot, while on the plateau the height tempers the heat. As in other tropical regions, the range of temperature is small. At Nairobi (5,450 feet) there is a difference of only 7° between the hottest and coolest months, and throughout most of the year it is as warm as it is in the south of England in summer.

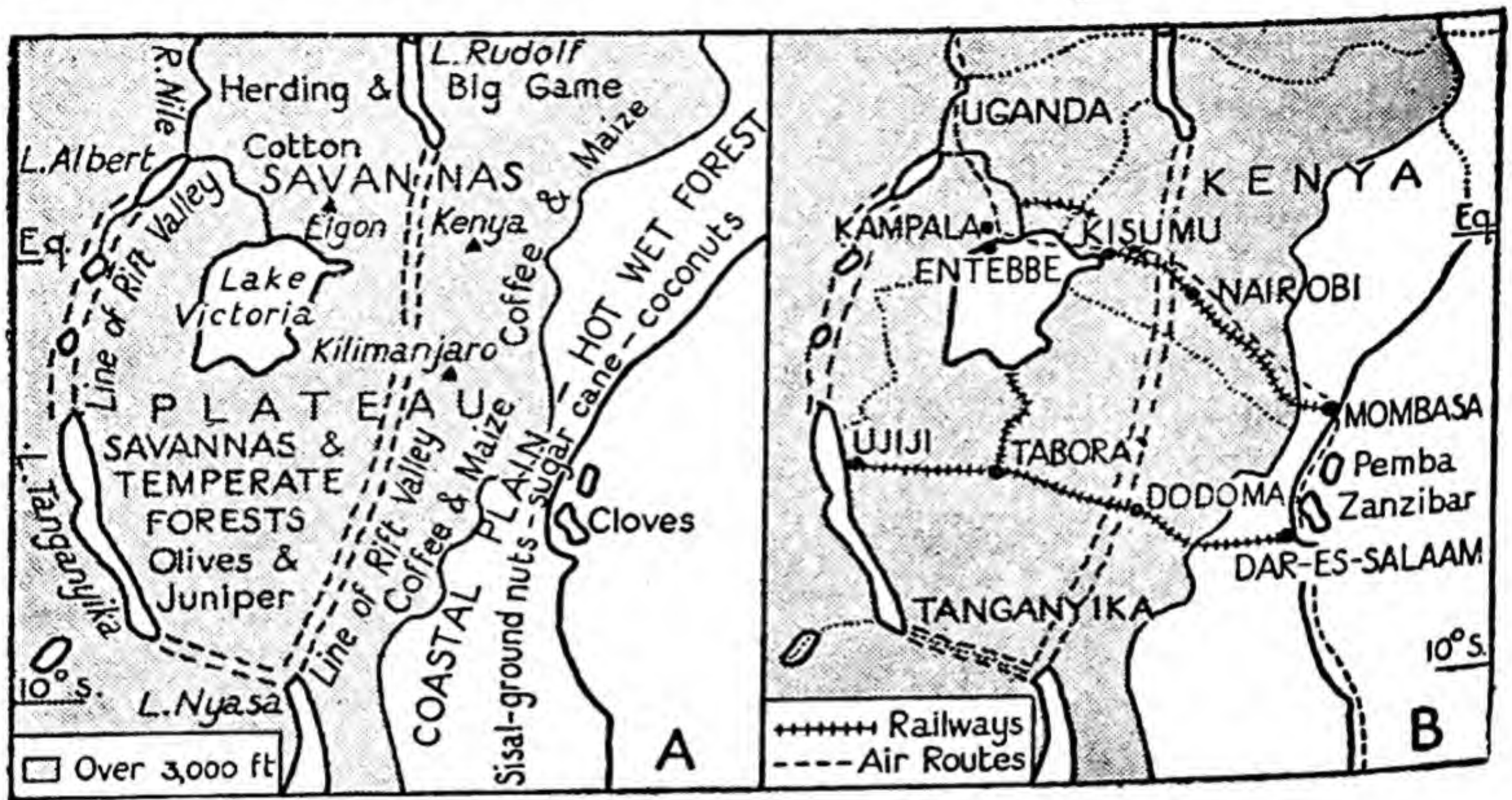


FIG. 19. British East Africa

Cloves and Coconuts

The mangrove swamps along the shore, the coconut palms fringing the sandy strands, and the forests all tell of the hot wet climate of the coastal belt. The forests, which are less luxuriant than those of the Congo Basin, and are interspersed with stretches of scrub, yield ebony and copal, a tree from which gum is obtained. Crops include sugarcane, rice, maize, bananas, and yams.

Cloves and coconuts are the chief cash crops. The islands of *Zanzibar* and *Pemba*, climatically part of the coast-lands, produce nine-tenths of the world's supply of cloves. The clove-trees, which grow to a height of from 30 to 40 feet, have dark glossy leaves. As the creamy-pink buds must be plucked immediately before they open, there



5. DRYING CLOVES AND CUTTING SISAL

(Above) Drying cloves in Zanzibar (see p. 79). The cloves are spread out thinly on concrete floors, or on mats, in the sun. After about five days they turn from a pink-green colour to the familiar brown. (Below) In this plantation in Tanganyika a man is cutting sisal with his sharp knife. The leaves will be crushed to obtain their fibre, which is made into rope and binder-twine (see p. 79).



6. HARVESTING COTTON AND TRANSPORTING GOODS IN MOZAMBIQUE

(Above) Harvesting cotton in Uganda (see p. 79). (Below) A safari, or hunting expedition, in Mozambique. In many parts of tropical Africa, especially where the tsetse fly makes animal transport impossible, goods are still carried by native porters. The porters can carry from 50 to 100 lb. on their heads for a distance of 50 miles or so.

is only a very short picking season, and much additional labour is required, the clove-pickers being conveyed free between the ports in Government steamers. There are two harvests, the principal one in May, the lesser in November. After they have been sun-dried (Plate 5) the cloves are stored in sheds to await shipment from Pemba and Zanzibar, the chief ports of their respective islands. Coco-nuts are an important food crop. Much copra, as their dried flesh is called, is exported: the bulk is shipped to Mar-seilles and Genoa, but some is utilized locally in the manu-facture of oil and soap.

Farming on the Plateau

Most of the Plateau is a savanna region, though there are extensive warm temperate forests whose trees include junipers, camphors, olives, and cedars, as well as bamboos.

Millet and maize are the staple food crops of the Africans. Maize is also grown on European farms, as, too, is wheat, which thrives at elevations ranging from 7,000 to 9,000 feet. Coffee, sisal, and tobacco are the main cash crops of the white farmers. Coffee, planted on slopes, is important in Kenya; sisal in Tanganyika; and tobacco in Nyasaland.

Sisal, grown on the lower parts of the Plateau and to some extent on the coast-lands, is a plant with long spiny leaves, which thrives on poor sandy soils. After cutting each leaf separately with sharp knives (Plate 5) the natives stack them in piles which are collected and taken to the factories. Here the leaves are crushed to obtain their fibre, which is made into rope and twine. Quantities of twine are exported to grain-growing countries, such as Canada, for use in the binding machines: a ton of sisal will yield enough twine to bind 1,000 acres of wheat.

Cotton is an important cash crop in Kenya, Tanganyika, and especially in Uganda, which alone produces more cotton than any other state in the British Empire, except India.

Nearly the entire crop is grown by native farmers who, unlike the hoe-cultivators in other parts of tropical Africa, use modern ploughs and other agricultural implements to till their land. After the cotton has been picked the fluffy white lint (Plate 6) is taken to small ginneries, where the seed is separated from the 'wool' which is baled for export.

Apart from favourable conditions of climate and soil, 'the remarkable development of the cotton industry in Uganda in recent years has been made possible by the extension of the railway and by the development of roads'.¹ From the rail-heads the bales are transported to Kilindini, whence the bulk is shipped to India (Bombay) and Japan, countries which supply East Africa with quantities of cheap cotton goods. The cultivation of cotton has brought as great prosperity to the farmers of Uganda as cacao has to those of the Gold Coast. Motor-cars, motor bicycles, and ordinary cycles provide evidence of their comparative wealth. But more important is the fact that the increased revenues derived from cotton have enabled the Government to extend the health and educational services, and so add to the general well-being of the community.

African, Asiatic, and European

In East Africa three races meet, the African, the Asiatic, and the European. Before the British occupation tribal wars, and constant raids by Arab slavers, decimated the population. But now the people are able to pursue their occupations in peace and, in most cases, to lead the lives suited to their environment.

There are in East Africa as many separate tribal groups, each with its own characteristics, as there are different races in Europe. Most of the people are Bantu or Hamites. Some, especially the coast folk, are of mixed blood. Some work in the towns; others on European farmsteads. But the

¹ Lord Hailey, *An African Survey* (Oxford University Press).

majority may be divided into two classes, namely, the agricultural and the pastoral.

Except in some districts, such as the low-lying area round Lake Victoria, the plateau is free from tsetse fly, and is suitable for stock raising. The pastoral natives are nomads. Large tracts of land have been set aside as reserves. The Masai Reserve, for example, about twice the size of Wales, is inhabited by some 50,000 Masai, a people once the terror of the country, but now peaceful herdsmen grazing their flocks, and hunting the 'big game' that abounds on the savannas.

A number of the agricultural people, such as the cotton growers of Uganda, have become progressive farmers. Most of them, however, cling to more primitive methods and grow crops, like millet and maize, to supply their own needs. But even these people own animals, as do nearly all African tribes unless they inhabit areas where cattle keeping is impossible. They live in villages, composed of mud huts thatched with grass, whose pattern varies according to the tribe. Each village consists of the head of a family, and his wife or wives, children, and possibly other relatives. Near by live groups of families belonging to the same clan. Thus the village is one close family circle. In this tiny world of mud huts all play their part. The youngster helps his father tend the flocks, or assists him to spread out hunting-nets in the bush into which buck and other small animals are driven. The mother sows and reaps the maize or millet as well as attending to her household duties. The leaders of opinion are the old people, whom the young men and women are taught to look up to and obey.

For centuries the coastal strip was visited by Arab slavers and traders, many of whom settled and made permanent homes here. In this region, as well as in the islands of Zanzibar and Pemba, live Arabs, and people descended from Arabs and their negro wives, who are known as Swahili,¹

¹ Arabic: *sahil*—coast.

or coast folk. In Zanzibar the Arabs are the principal land-owners, but the majority of the people are Africans. There are also some 14,000 Indians through whose hands passes most of the native trade of East Africa.

For centuries people from India settled in East Africa, but most of the present Indian inhabitants came in quite recent times to help in the construction of the railways. To-day, scattered throughout East Africa, there are nearly 100,000 Indians and other Asiatics, the majority being Indians. Many occupy responsible positions on the railways, others are shop-keepers, clerks, and artisans, or work in hotels. These Asiatics have similar rights to Europeans, both as regards ownership of land and citizenship.

The climate has enabled European settlers to make permanent homes on the Plateau, where the majority own or lease farms which they work with African labour. There are, however, only about 32,000 white people in British East Africa, compared with an African population of some 14,000,000.

Communications and Towns

Kenya and Uganda. There is a charm about *Mombasa*, the chief port of Kenya, whose white-walled, red-roofed houses stand out against the vivid green of countless palms. It lies on a small island on the opposite side of which is the modern, deep-water port of *Kilindini*, situated on one of the finest harbours on the coast of East Africa. The *Kenya and Uganda Railway* crosses to the mainland by a long iron bridge, and passing through the forest belt climbs upwards to *Nairobi*, the capital of the Kenya Colony. Thence, after descending to the Eastern Rift Valley, it makes the steep ascent to the plateau, and then drops down to *Kisumu* on Lake Victoria. Oil-burning steamers carry the traveller across the lake to *Entebbe*, the political capital of Uganda, or to *Port Bell*, the port for *Kampala*, the main commercial centre and native capital. In certain parts of Lake Victoria

passengers must cover their heads with veils to protect them against tsetse flies.

Zanzibar and Pemba. There are regular steamer services between the ports of Zanzibar and Pemba, and with the mainland of East Africa and Aden; as well as with Portuguese East Africa, South Africa, and India. A considerable coastal trade is carried on by dhows. Zanzibar and Pemba are separated from Tanganyika by a channel having a minimum width of 22 miles. Zanzibar, with an area of 640 square miles, is the bigger of the two islands, and is also the largest coral island off the coast of Africa. Formerly centres of the slave trade, the islands are now a British protectorate.

Tanganyika. Steamers run southward across Lake Victoria to the port of *Mwanza*, in Tanganyika, whence a branch of the *Central Railway* runs through a cotton-growing district to Tabora, a junction and a caravan centre. From Tabora the line goes through Ujiji, once an Arab market for gold, ivory, and slaves, to the modern port of Kigoma, whence steamers run across Lake Tanganyika to Albertville, in the Belgian Congo. Eastward from Tabora the *Central Railway* goes to Dodoma, a growing town and airport on the *Great North Road* which runs from Northern Rhodesia, through Tanganyika to Kenya. Descending to the coast the railway reaches *Dar-es-Salaam*, the port-capital of Tanganyika.

The *Nyasaland Protectorate* stretches along the southern and western shores of Lake Nyasa and extends almost to the Zambezi. In former days the lake was frequented by the dhows of Arab slavers, but now it is relatively little used for shipping. There is no rail connexion between Tanganyika and Nyasaland, but a motor highway links the Protectorate with the Great North Road. From Salima, at the southern end of Lake Nyasa, the railway runs through *Zomba*, the seat of the Government, to *Blantyre*, named by Livingstone after his birthplace in Scotland. Descending

from the highlands the line runs down the Shiré valley to the Zambezi. It crosses the river by the Lower Zambezi Bridge, somewhat more than 2 miles long, on its way to the port of Beira in Portuguese East Africa, through which are exported the tobacco, tea, coffee, and cotton grown in Nyasaland.

British Overseas Airways liners, on the London to Durban route, call at Port Bell, Mombasa, Dar-es-Salaam, and Beira. Connecting services link Nairobi with Dodoma and the Rhodesias.

EXERCISES

1. Divide British East Africa into two Natural Regions. Describe the climate and crops of *one* of these regions.
2. Compare British East Africa with West Africa under the following headings: Relief; Natural Vegetation and Crops; Settlement.
3. With the aid of your atlas describe a journey by steamer and railway from Stanleyville (Belgian Congo) to Dar-es-Salaam.
4. Examine Plate 6 (top) which shows a cotton plantation in Uganda. (i) What is in the baskets? (ii) Estimate the height of the cotton plants. (iii) To what building will the cotton be taken and what will be done to it there? (iv) How is it packed for export?

CHAPTER XI

NORTHERN AND SOUTHERN RHODESIA

A Great Pioneer and His Vision

NOT far from Bulawayo the Matoppo Hills rise high above the wind-swept surface of the plateau. Here amidst these wide expanses lies a solitary grave—that of Cecil Rhodes, one of the greatest pioneers Africa has seen. It was he who in 1899 obtained a charter for the British South Africa Company. In 1923 Southern Rhodesia, named after him, became a self-governing colony, and a year later the Crown took over the government of Northern Rhodesia. Cecil Rhodes dreamed of a belt of British territories extending from the Cape, through East Africa, to the Mediterranean; and of an all-British railway route from Cape Town to Cairo, the capital of Egypt, which in his time was a British Protectorate. In part his dream came true, for to-day from South Africa northwards to the Anglo-Egyptian Sudan stretches a block of territory all of which forms part of the Empire. It is possible to travel by rail, road, and water from Capetown to Wadi Halfa, on the southern frontier of Egypt, without leaving British soil. The name of Rhodes, like those of Botha and Smuts—those soldier-statesmen and idealists who have played so great a part in building the Union of South Africa—will always live in the history of the British Commonwealth of Nations.

Wooded Savannas and Forested Valleys

The Zambezi separates Northern from Southern Rhodesia. These countries form a transitional zone between British East Africa and South Africa, and like these adjacent regions consist mainly of high plateaux. The elevation tempers the heat, and their more southerly situation makes the Rhodesias somewhat better suited to white settlement

than British East Africa. Most of the rain falls in summer, the rainy season lengthening towards the north, but there are occasional showers during the cool season. The plateaux are in the savanna belt, which is especially well wooded in the north where extensive areas are covered with dense bush. The valleys are forested, but the lower ones and the delta of the Zambezi are unhealthy and infested with tsetse fly.

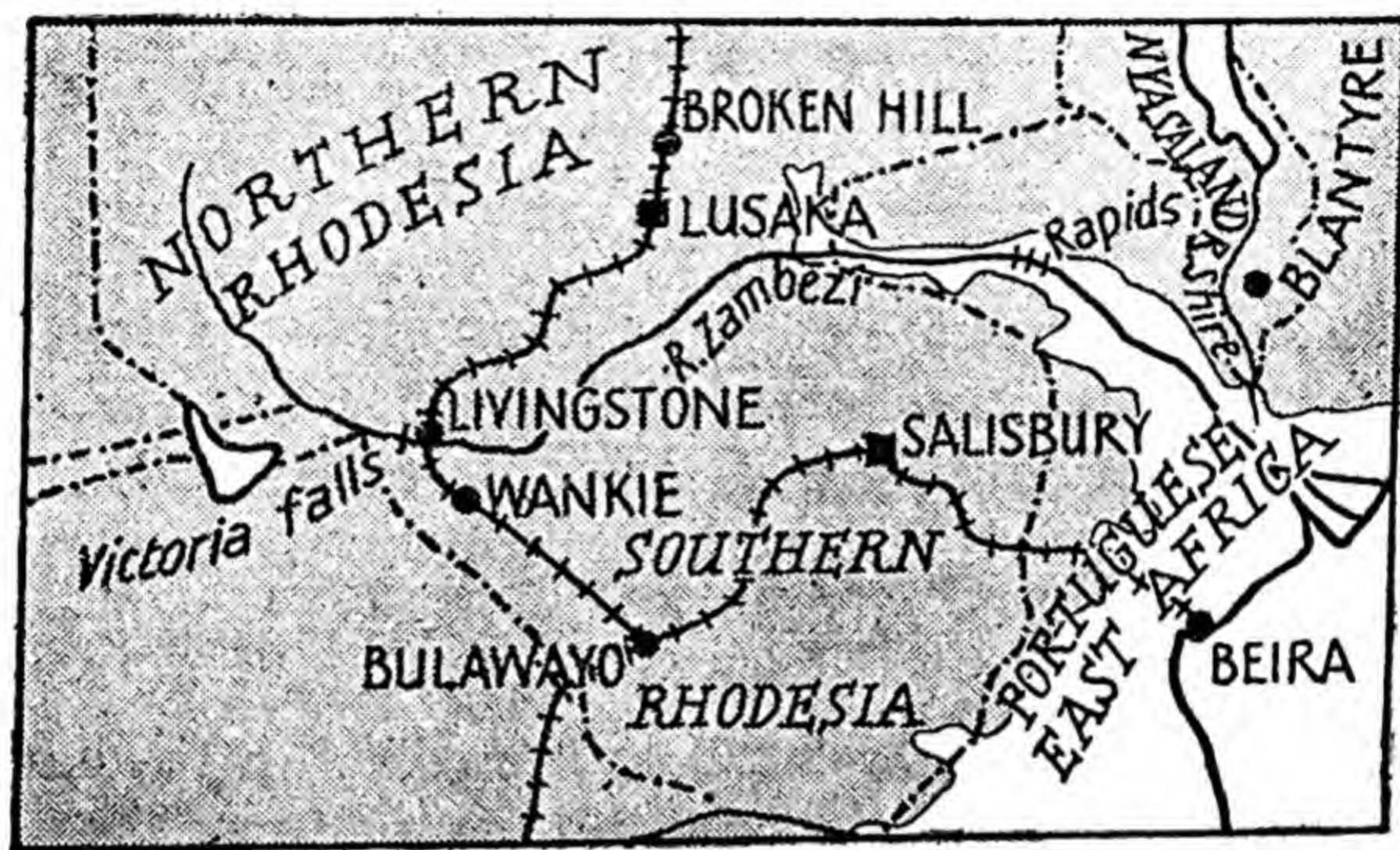


FIG. 20. Rhodesia

Small vessels can ascend the Zambezi for some 400 miles as far as the Kebrabasa Falls. In its middle course the river now divides into many channels as it winds through enormous swamps, and now flows through narrow valleys between wooded hills. But it is navigable for hundreds of miles between rapids where it descends from higher to lower plateaux. At the Victoria Falls the river, a mile wide, tumbles over a precipice more than 400 feet high, into a narrow zigzag gorge some 40 miles in length. The native name for these wonderful falls is *Mosi-oa-Tunya*—‘the smoke that thunders’—and it is this thunder rather than the size of the falls which first impresses the observer.

‘In the Victoria Falls Nature has fashioned her work on such an immense scale that he who would know it must

count his time not in hours but in days. . . . He must gaze down into the gorge that turns at right angles at the foot of the Devil's cataract and see rainbow after rainbow come into being amid the spray of the Falls. . . . And then he may scramble down the path that winds amongst the moss-covered boulders and twisted ferns into the Palm Grove, where from the level of the waters in the gorge he may look up hundreds of feet into the heights above.'¹

The power of the Victoria Falls has not, as yet, been harnessed, like that of Niagara, for generating electricity, and the district around preserves its sylvan beauty unspoilt by house, hoarding, or factory.

Northern Rhodesia

Northern Rhodesia, somewhat more than three times the size of the British Isles, is inhabited by 1,300,000 people of Bantu stock, and 10,000 Europeans. Many of the latter live on farms where they graze cattle, and grow maize, wheat, and tobacco as their main crops. In recent years the planters round Abercorn, at the south end of Lake Tanganyika, have started to cultivate coffee. Other white people hold administrative posts in mining camps, or live on Government outposts, or on mission stations. Some reside in townships, such as *Lusaka*, the capital; and the mining centre of Broken Hill. Both of these towns are situated on the railway which enters the colony at Livingstone and runs across it to the High Katanga District of the Belgian Congo.

The homes of the Bantu are villages scattered throughout the bush, whose appearance has altered little with the passing centuries, except that they are no longer surrounded by stockades. Most of the tribes keep cattle, and grow millet and maize, the latter being made into porridge, which is their principal food. Hoe cultivation is the general rule,

¹ *The Times*.

though the peoples living near the railway have begun to use ploughs, and owing to their improved methods of farming have a surplus of maize for sale. Numbers of men work in the great copper mines, such as the Roan Antelope Mine, at Luanshya, where about 4,000 persons are employed. Here they may toil underground, or in the refineries where the copper is turned into ingots which are sent by rail to Lobito (Angola) for shipment to Britain. But after a time the miner usually returns to his village, often several hundreds of miles distant; possibly travelling part of the way by rail, and part by lorry; sometimes cycling, but more often journeying on foot, carrying his possessions on his head.

Southern Rhodesia

Though Southern Rhodesia is little more than half the size of Northern Rhodesia, yet owing to its higher latitude it contains almost as many inhabitants. Its white population—mainly of British stock—which has doubled in the last twenty years and is now about 55,000, is somewhat greater than that of British East Africa and Northern Rhodesia combined.

The savannas are admirably suited for stock rearing and agriculture. Maize, tobacco, and fruits including oranges and lemons are the main crops grown by the white settlers, who also graze beef and dairy cattle, the district round Gwelo being especially noted for dairying. Some of the natives work on the plantations, but numbers live in their kraals on reserves, grazing their flocks and growing maize, beans, and millet.

Mining is important and, as in Northern Rhodesia, the Bantu population provides the manual labour. *Gold*, which supplies 50 per cent. of the value of the exports, is mined round Salisbury, Gwelo, and Bulawayo; coal at Wankie; chrome ore near Gwelo; and asbestos in the Bulawayo district. Considerable quantities of coal, together with

maize, fruit, and cattle, are exported by rail to the High Katanga copper-mining district of the Belgian Congo.

Like its British neighbour north of the Zambezi, Southern Rhodesia has no seaboard. *Salisbury*, the capital of Southern Rhodesia, is linked by rail with Beira in Portuguese East Africa, and with *Bulawayo*, the junction for the line from Cape Town to Northern Rhodesia and the Belgian Congo. Local air lines connect Salisbury and other towns with the British Overseas Airways service which passes through Beira on its way to Durban.

EXERCISES

1. Write an account of Southern Rhodesia under the headings: Position and Size; Climate and Suitability for White Settlement; Products; Towns and Communications.

2. With the aid of your atlas give an account of a railway journey from Beira to Lobito. Describe the natural vegetation and products of the regions through which you pass. Name *eight* important towns (apart from the terminal ports) including *one* at least in each country through which you pass.

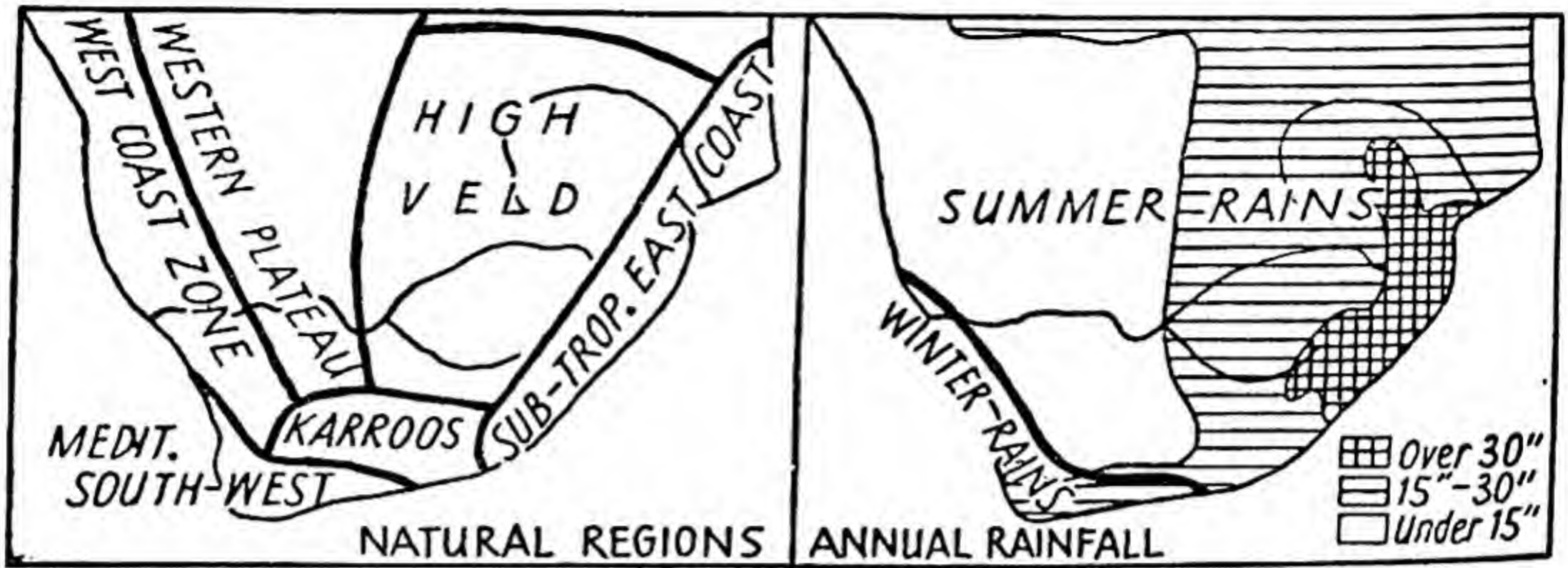


FIG. 21. South Africa: Natural Regions and Rainfall

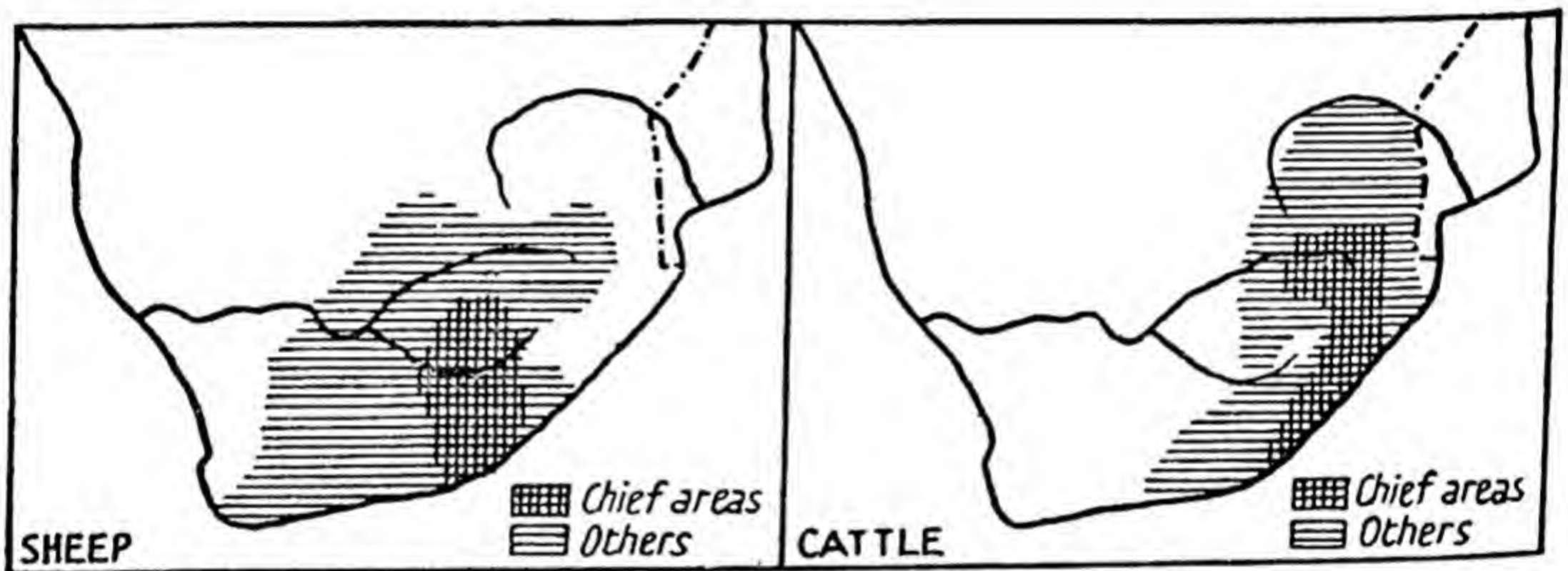


FIG. 22. South Africa: Distribution of Sheep and Cattle

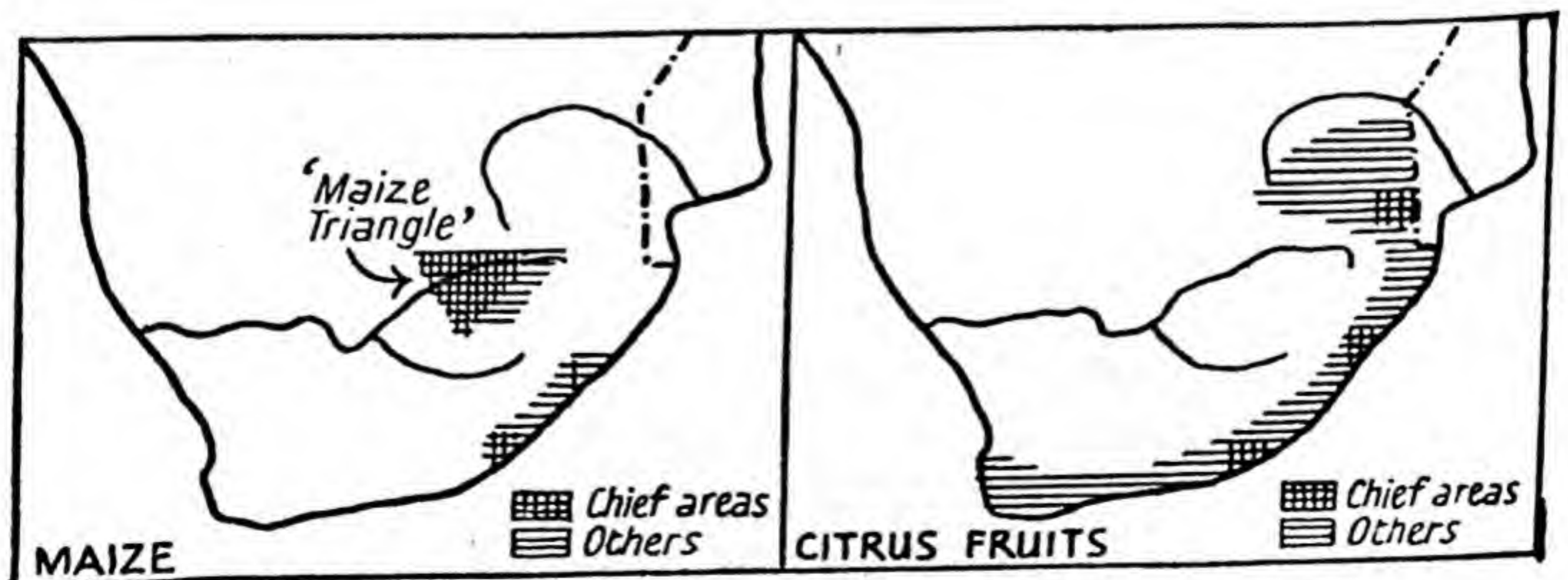


FIG. 23. South Africa: Distribution of Maize and Citrus Fruits

CHAPTER XII

THE UNION OF SOUTH AFRICA

The Union, the Mandated Territory, and the Protectorates

THE Union of South Africa, one of the Dominions of the British Commonwealth, is about four times the size of Great Britain. It consists of the former British colonies of the Cape of Good Hope and Natal, together with the Orange Free State and the Transvaal, both founded by Boer settlers of Dutch extraction. The one-time German colony of South-West Africa is administered by the Union Government, under a mandate from the League of Nations. But the Protectorates of Bechuanaland, north of the Limpopo River, and Basutoland and Swaziland, on the borders of Natal, are at present ruled by the British Government, which exercises its authority over the native peoples mainly through their tribal chiefs.

The Peoples of the Union

Of the 9,500,000 inhabitants of the Union some 6,500,000 are Bantus, and about 2,000,000 are Europeans either of British stock, or Afrikaners (Boers), descendants of the Dutch settlers. The former, of course, speak English; the latter Afrikaans, a variant of the Dutch language. The British, who are most numerous round Capetown, in Natal, and on the mining district of the Rand, are chiefly concerned with commerce, mining, and finance; the majority of the Afrikaners are farmers. Only men and women of European descent have the right to vote or to become members of Parliament, but the native peoples have their own Representative Council which deals with their affairs. About half the Bantu are pastoral and agricultural people.

The remainder work on farms owned or managed by white people, in the mines, or in towns where they usually obtain jobs as 'unskilled labourers'.

There are also a quarter of a million Asiatics who are chiefly Indians, though some are Malays. The majority of the Indians, most of whom live in Natal, are descendants of coolies who came from India to work on the plantations, where many Indians are still employed.

Of the remaining peoples, about three-quarters of a million are of mixed white and coloured descent. The greater number are found in the south-west of the Cape Province, where they are known as 'coloured people', a term not applied to Bantus or Asiatics.

Relief, Climate, and Natural Vegetation

South Africa consists of a high plateau which rises by steep escarpments from narrow coastal plains. Nearly half of this table-land is over 4,000 feet above sea-level. It is highest in the east, where its edge is formed by the Drakensbergs which front the rolling coast-lands of Natal. On the south the plateau descends to the Great Karroo and then by another escarpment to the Little Karroo, separated by the Langebergen from the coastal belt. On the western slopes of the Drakensbergs rise the Orange river and its tributary the Vaal. The main stream, which flows to the Atlantic in a deep boulder-strewn gorge, is interrupted by falls, and is useless for navigation, though in some districts its waters are used for irrigation. In the north of the plateau the granite ridge known as the Witwatersrand, or more popularly as the Rand, forms the divide between the Vaal and the headwaters of the Limpopo, which follows a semicircular course to the Indian Ocean.

Taken as a whole South Africa is a dry country, and the elevation reduces the temperature. Most of this region lies in the south-east trade wind belt. The wettest part is the

east, where the south-east trades bring heavy rain to the windward slopes of the Drakensbergs and the lowlands at their base. These winds blow most strongly and cause most rain in summer (October to March) when the heated air over the land is rising. The rainfall decreases steadily towards the west. Though the greater part of South Africa receives rains in summer from the



FIG. 24. South Africa: Section North to South

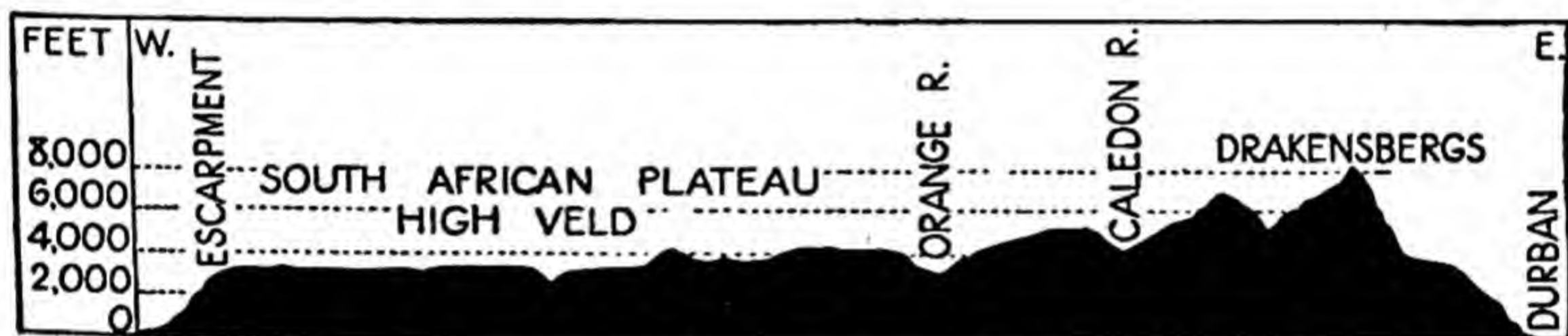


FIG. 25. South Africa: Section East to West

prevailing trade winds, the west side of the plateau and the coast-lands are dry at this season because the winds blow off-shore. The extreme south-west of South Africa has a Mediterranean climate with dry summers and rainy winters.

The High Veld

The High Veld, which forms the eastern part of the plateau, consists of treeless plains and wooded valleys. Its sunny climate makes it one of the healthiest regions in the world. So clear is the air that it is often possible to see for miles over the wide expanses, whose surface is broken only by kopjes, as the flat-topped hills are called, capped by hard layers of the horizontal strata.

Maize, or mealies as it is called, is the chief crop. It is a valuable cattle food, and maize porridge is the staple diet of the Bantu population. The principal producing area is in the wetter east, where the district known as 'The Maize Triangle' furnishes nearly two-thirds of the total output of

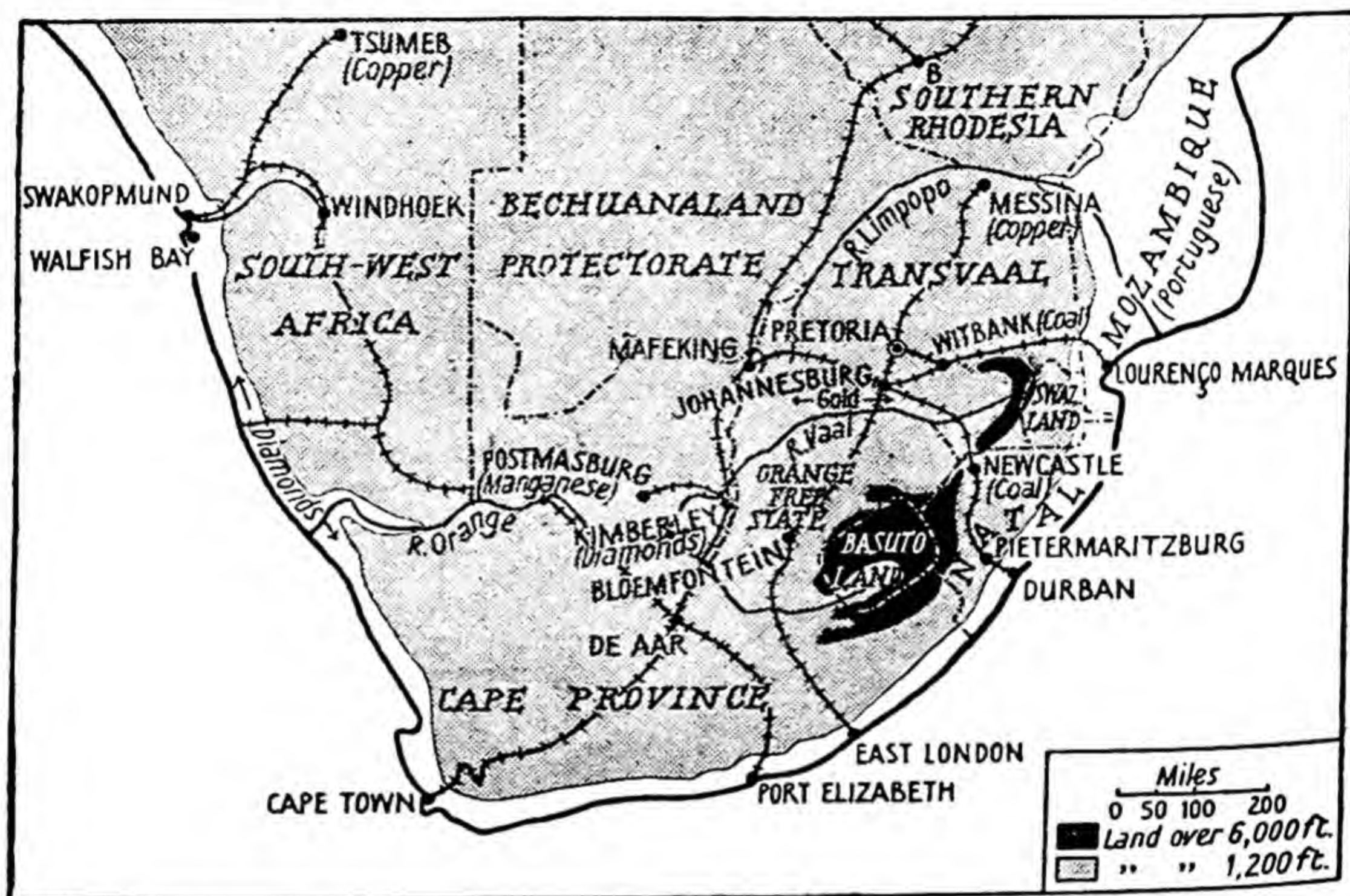


FIG. 26. South Africa: Minerals, Towns, and Railways

the Union (Plate 7). In the Transvaal, tobacco and citrus fruits are grown in irrigated valleys.

But the greater part of the Veld is a pastoral area and its chief wealth lies in its sheep and cattle. In the wetter and warmer north-east cattle are reared both for meat and dairy purposes. In the drier south, where the pasture is poorer, sheep are grazed mainly for their wool, which ranks as the second export of the Union. On the farms oxen, mules, and donkeys are used for ploughing and carting in preference to horses, which are liable to 'horse-sickness'.

Though in most areas the rainfall is light, the great difficulty the farmer has to face, at any rate in the eastern

part of the High Veld, is not so much the lack of rain as its uncertainty, and the fact that it often falls in torrential storms. Sometimes 2 to 3 inches, out of an annual total of from 15 to 20 inches, will fall in the course of a few hours. During such heavy downpours the dried-up watercourses, called *dongas*, are filled to the brim, and even the sheep and cattle tracks are turned into raging streams. Then soon, unless proper steps have been taken, the waters run to waste, carrying away valuable surface soil and leaving behind barren furrows. To prevent the animals from wandering at large and creating unnecessary tracks the farmer fences his land into paddocks. He also builds dams across the *dongas* and furrows so that during downpours the water remains in the channels and the stirred-up soil is ultimately spread over the land instead of being scoured away. Thus in time the furrows are filled up and with care become good pasture land. The water, too, if retained behind dams, rises gradually over the banks of the streams and soaks into the ground, which sucks it up like some gigantic sponge. The careful farmer does not overstock his land. If thin pastures are overstocked, or over-grazed, bald patches appear, soon the grass gives up the unequal struggle, and the ground becomes bare and arid. On the veld, owing to the need of preserving pasture, most of the land carries few animals per acre: so the farms are large, and the farmsteads are sometimes as much as 20 miles apart.

Living more or less isolated from their neighbours, the Boer farmers are extremely self-reliant, and have developed a sturdy and independent outlook.

The Karroos

On the south the plateau drops by steep escarpments (see Fig. 24) to the Great and Little Karroo. These dry treeless uplands are strewn with boulders and dotted with sweet-smelling Karroo bush, whose long roots and tough leathery leaves enable it to live when all other forms of plant life

have died through lack of moisture. Millions of sheep and Angora goats are grazed: the former are bred for wool, the latter for mohair, both products being exported through East London. There are still a number of ostrich farms on the Karroos where the birds are reared in paddocks and fed on lucerne (alfalfa), an ideal fodder crop for dry lands as its roots go many feet into the soil in search of moisture and so grow more luxuriantly than other grasses. But ostrich farming, dependent as it is on the whims of fashion, is a declining industry, and many farmers have turned their attention to more useful industries, such as rearing pigs and poultry.

The South-West—Orchards and Vineyards

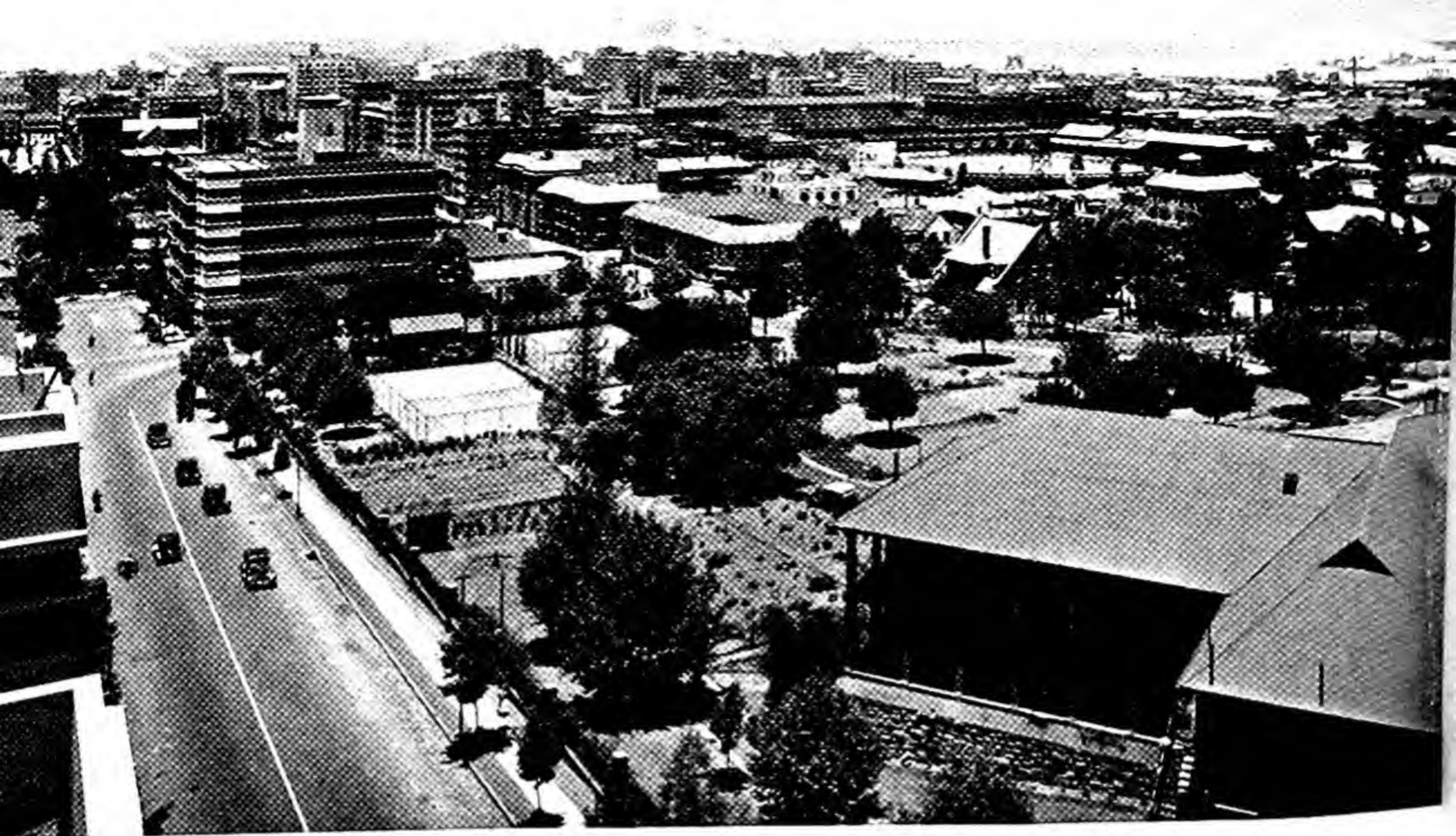
The South-West, with its dry sunny summers and mild showery winters, is the chief fruit and vine-producing region in the Union. Finely engineered roads run up the wooded valleys, past orchards and vineyards, to the great plateau beyond. Many of the farms are owned by people of Dutch or French Huguenot descent, employing 'coloured' labourers who live with their families in cottages each with its own garden plot. Some of the gabled farm-houses, with their white walls and broad *stoeps* (open verandahs), date from the time of the early settlers, though to-day many of the thatched roofs have been replaced by those of corrugated iron.

Work on the farms continues throughout the year. In fact, in December and January so much extra help is needed that European children from the villages and university students often spend their summer holidays helping the 'coloured' workers to pick the fruit. The finest peaches, plums, apricots, and pears are packed in cases which are sent to Capetown. Here they are put aboard steamers, fitted with refrigerating chambers, which carry them to the British Isles, where the fruit arrives just as supplies from



7. FARMING IN THE UNION OF SOUTH AFRICA

(Above) Sugar plantations in Natal (see p. 97). The canes are planted in rows with sufficient space between each to allow the workers to fell them. The rolling country is typical of that lying between the Drakensbergs and the coastal belt. (Below) Another plantation in the Union (see p. 106) where the crop is ready for harvesting.



8. THE UNION OF SOUTH AFRICA—SCENES IN TOWN AND COUNTRY

(Above) Johannesburg (see p. 101). The well-planned city in the foreground presents a striking contrast to the dumps of cyanide waste from the mines, which are seen in the background. Yet these dumps are reminders that Johannesburg is the chief gold-mining centre in the world. (Below) A farmer on the Veld taking his produce to market in a wagon drawn by eight yoke of oxen, animals which are widely used both for transport and draught purposes (see p. 94).

the northern hemisphere are beginning to fail. Towards the end of February or the beginning of March the grapes are gathered. Some of the best ones are sold for table use; some are sun-dried for raisins; some distilled for brandy; but the bulk are pressed for wine. As soon as the grape harvest is over the ground is weeded. During the autumn months of March and April the fruit trees and vines are pruned and manure is spread over the land and later ploughed in. In winter and early spring the trees are sprayed to destroy insect pests, and the ground is kept clear of weeds and loosened so that the rain will sink in.

On many farms some of the land is under wheat, for the South-West is the chief wheat producing area in the Union. But the supplies are insufficient for the home demand and much wheat is imported from Australia.

The Sub-Tropical East Coast Region

The East Coast Region, comprising Natal, Swaziland, and the south-east of the Cape Province, may be divided into three zones: (a) the undulating coastal zone; (b) the somewhat higher middle agricultural zone; and (c) the slopes of the Drakensbergs.

The hot wet summers and mild winters make the forested *coastal zone* well suited for sugar-cane, pineapples, bananas, and citrus fruits, such as oranges and grapefruits. Formerly tea was grown on well-drained slopes, but its cultivation has declined and now much is imported from India and Ceylon. Along the warmer northern coast-lands are plantations of sugar-cane where the feathery plants grow in profusion under sunny skies (Plate 7). Enough sugar is produced to supply the needs of the Union. In the sowing season the Indians may be seen bending over the rows planting out the canes in furrows. Later they are busy weeding, and then comes harvest when the tangled masses of cane are cut with sharp knives and taken to the refineries. In the *middle agricultural zone* maize and other cereals,

temperate fruits, and vegetables are cultivated. The lower *slopes of the Drakensbergs* are mainly a pastoral region. The wattle, a species of acacia, introduced from Australia, yields bark for tanning leather—an industry of no small importance in a country where in 1940 there were 40 million sheep, 11 million cattle, and over 6 million goats.

Minerals

Almost half the world's *gold* is obtained from the Union of South Africa where gold accounts for nearly 70 per cent.



FIG. 27. The Production of Gold.

1. South Africa; 2. U.S.S.R.; 3. Canada; 4. U.S.A.; 5. Australia.

of the country's exports. The chief producing area is the Rand where for 40 miles both east and west of Johannesburg extend the mines to which the city owes its prosperity, and which have made this area the most thickly peopled part of the Union. The precious metal lies embedded in quartz veins (reefs), which may vary in thickness from several inches to 20 feet. More than 300,000 people are employed in the mines, but little more than one-tenth are white people. Some mines are over a mile deep. Some men blast the rock, and others work the machinery by which it is hoisted to the surface. But before the gold can be obtained there are many difficulties to be overcome, for the metal occurs in such fine particles that it cannot be seen by the naked eye.

After the rock has been crushed, washed, and sorted it is ground into an extremely fine powder. This powder is then treated and some of the gold extracted, but as much remains further treatment is necessary. Hundreds of tons of the residue are poured into huge vats contain-

ing cyanide, which dissolves the tiny gold particles, and after further processes the remaining gold is obtained. The huge mounds, looking rather like masses of damaged flour, that disfigure the districts round the mines, are actually dumps of cyanide waste (see Plate 8). In contrast to placer mining, the machinery required for large-scale gold mining, as carried on in the Rand, is extremely costly and the mines are worked by large companies having the necessary capital.

Many of the world's *diamonds* come from South Africa, where they are obtained from mines at Kimberley, and from South-West Africa where they are obtained from a coastal strip north of the Orange River.

The Union has large deposits of *coal*, and though not of the highest grade the seams are usually thick and so it can be mined cheaply. The principal mines are round Witbank in the Transvaal and Vryheid in Natal. At Witbank there is a large thermal power station which supplies the Rand gold mines with electricity. Much coal is sent to Durban and Lourenço Marques where it is used for bunkering ships; some is exported to India. There are enormous deposits of low-grade iron ore in the district round Pretoria, and even in the town itself, where it is used in the iron and steel works of the city. But even more important is the high-grade haematite ore obtained in the Crocodile River valley, where the chief centre is Thabazimbi (*thaba* = mountain; *zimbi* = iron), 93 miles north-west of Pretoria. The mines are 'open-pit' workings from which the ore is lifted by huge mechanical shovels. Coal is brought from Natal for smelting these ores, as Transvaal coal is unsuitable.

Copper is obtained from Messina in the north of the Transvaal. *Manganese ore*, mined at Postmasburg (somewhat more than 100 miles westward of Kimberley) is sent by rail to Durban, where there is a special wharf for handling this valuable product.

Towns and Distribution of Population

The most thickly peopled areas in the Union lie round Capetown, Port Elizabeth, and Durban, and on the Rand from the Johannesburg district northward to Pretoria. Capetown and Port Elizabeth are the principal ports. Most new-comers from England to South Africa make their first acquaintance with the Union when, after a sea voyage of fourteen days, they land at *Capetown*, standing on Table Bay and overlooked by flat-topped Table Mountain. Often on a summer's morning the sparkling blue waters of the Bay are scarcely ruffled by the breeze, but sometimes, especially in winter when north-westerly gales blow from the Atlantic, the waters are lashed into fury and giant waves dash high against the breakwater which protects the shipping in the harbour. The port is some 3,000 miles from Rio de Janeiro, and 4,700 miles from Fremantle in Australia. Vessels from Britain travelling by the 'Cape Route' to Colombo, Singapore, and Australian ports call at Capetown, as do ships *en route* from Buenos Aires to Melbourne and Sydney. Capetown ranks as the first exporting port of the Union, for, apart from the fruit and wine produced in its immediate hinterland, it is better placed for trade with Britain than the east coast ports, and is an important outlet for the gold and other minerals of the plateau. As one of the two capitals of the Union it is the meeting-place of the Parliament.

Port Elizabeth, on Algoa Bay, exports wool from the Karroos and fruit from the district around the town. It also assembles motor-cars, using imported parts. To-day *East London* is the principal wool market and wool exporting port in the Union. Its harbour is protected by breakwaters from the South-East Trades, which blow especially strongly in summer.

Durban, though not large when compared with other ports of the Southern Hemisphere, such as Rio de Janeiro

or Sydney, is the chief port on the east coast of Africa. Washed by the sea on two sides, the town is beautifully placed on a sheltered bay. Many ships call here for bunker coal, while colliers load cargoes for India and Aden; and other vessels take aboard maize, fruits, and sugar. From Durban whaling ships sail for Antarctic waters. The port is a terminus of the British Overseas Airways service from London to South Africa. From Durban the railway climbs to *Pietermaritzburg*, the capital of Natal, whence it winds up through the Drakensbergs to Newcastle on its way to Johannesburg.

The importance of *Johannesburg* as the leading town of the world's greatest gold-mining area, together with its central position, has made it a focus of rail, road, and air routes. Of course the mining districts around, with their galvanized-iron buildings and great dumps of waste, are drab and ugly, but in Johannesburg itself are fine streets and buildings, and away from the mining area are pleasant suburbs set on pine-clad ridges (Plate 8). By far the biggest town in the Union, the city is surrounded by smaller industrial centres such as Germiston, noted for gold-refining and a junction on the railway from Pretoria to *Bloemfontein*, the capital of the Orange Free State.

To the north of Johannesburg, in a warm sheltered valley with irrigated orange orchards and tobacco fields, lies *Pretoria*, the seat of the Union Government. It has railway and iron and steel works.

The Development of the Railway System

As most of South Africa is a plateau, little less than a mile above sea-level, which rises by steep escarpments from the coast-lands, the building of railways has been difficult and costly. They avoid the highest part of the Drakensbergs, running from the coast north and south of this area. In its outline the railway system is simple (see Fig. 26). The principal lines run from the ports—Capetown, Durban,

Port Elizabeth, East London, and Lourenço Marques (Mozambique)—through the chief towns of the plateau, to the thickly peopled district around Johannesburg and Pretoria. In the Cape Province, De Aar, owing to its central position, is a busy railway junction. It is doubtful whether many of the lines would ever have been constructed except for the mineral resources. Both the chief mining and the best agricultural areas are in the east, and con-

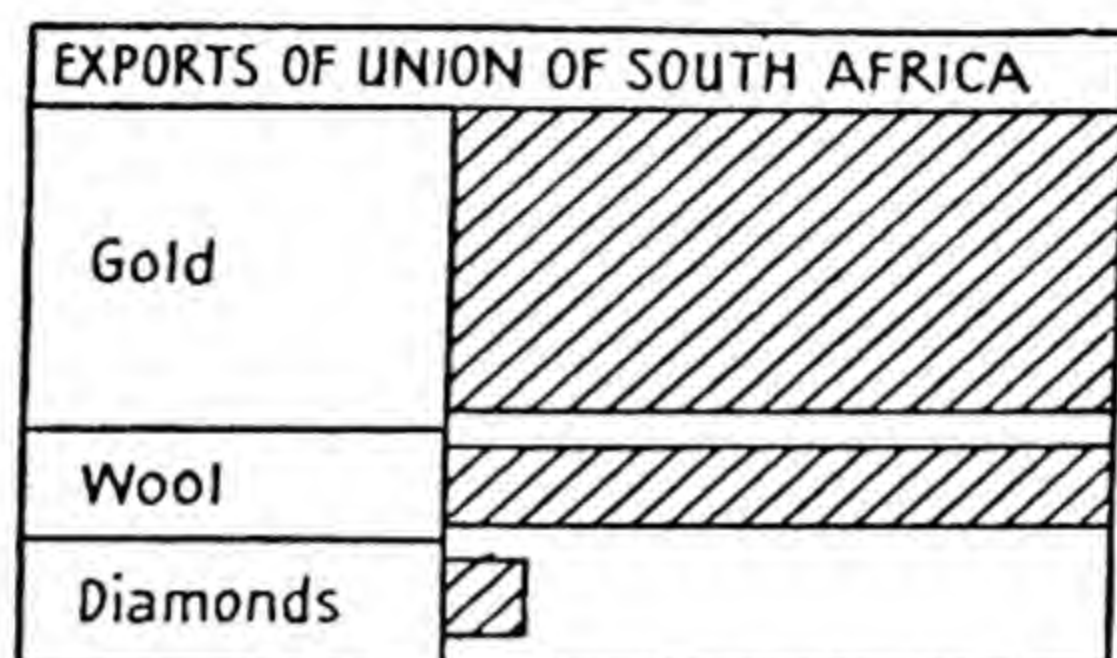


FIG. 28.

sequently it is in this region that the railway net is most widely spread.

The map (Fig. 26) shows that the nearest port to both Pretoria and Johannesburg is *Lourenço Marques*, in Portuguese territory. This port, on a splendid and well-equipped natural harbour, exports fruit and coal from the Transvaal, but as the bulk of South African trade is with Britain an even greater amount of produce is exported through Capetown, better placed, as we have seen, for European trade. From Johannesburg railways run (through Germiston Junction) south-east to Durban; and south through Bloemfontein to Port Elizabeth and Capetown. The main line from Capetown to the Belgian Congo climbs up to the Karroos, and thence north-east across the plateau to De Aar where one line goes south-east to Port Elizabeth, and another north-west to connect with the South-West African Railways. Continuing northward from De Aar, it runs through Kimberley and, after leaving the Cape

Province, enters the Bechuanaland Protectorate on its way to the Rhodesias. This railway was meant to form part of an 'All-British' route from the Cape to Cairo, and as it was built before the Union came into being it avoided the Transvaal and the Orange Free State.

Bechuanaland, Basutoland, and Swaziland

Nearly a million people of Bantu stock have their homes in the British Protectorates of Bechuanaland, Basutoland, and Swaziland where, apart from a few thousand Europeans and Asiatics, they comprise the whole population. In Bechuanaland, which occupies the north central portion of the South African plateau, a quarter of a million people are spread over an area approximately equal to that of the Cape Province. The far smaller but better watered territory of Basutoland (11,716 square miles), tucked away on the western slopes of the Drakensbergs, has half a million inhabitants. Swaziland, whose climate and vegetation resemble those of Natal, is nearly as big as Wales and has a population of 150,000.

The kraals in these Protectorates, like those in the Union, probably differ little in appearance from those of a thousand years ago. Usually clustered on slopes, or along a ridge, they are surrounded by tilled and fallow plots. The villages differ, but often the round huts, built of stone or mud and thatched, are ranged about a central space, and the group is sometimes encircled by a fence of woven reeds, for protection against wild animals. As a rule the village communities, each with its headman, vary from 30 to 500 people, though in Bechuanaland and Basutoland some groups are large enough to form good-sized towns.

When the Dutch and English came to South Africa the Bantu tribes lived by herding, hunting, and growing enough food for their needs. To-day they still graze ponies, cattle, sheep, and goats, but big game no longer abounds and in some districts the men are reduced to hunting rats.

Some tribes produce a surplus, but many do not grow enough mealies, kaffircorn (a kind of millet), and minor crops to supply their own requirements and are obliged to buy stocks from white farmers. In former days the natives were skilled craftsmen. Now they purchase goods from European traders whose stores are scattered at intervals of about half a dozen miles. The sale of hides, wool, and cash crops where available, does not bring in enough money to enable the natives to buy the goods they need, or to pay the poll- and hut-taxes to which every adult male is liable. So to supplement their meagre resources many men leave their kraals, where life moves in leisurely fashion and time is measured by the sun and the seasons, and go to work on farms or mines in the Union or the Rhodesias. No longer do they lead a life suited to their traditions and their environment. In their new surroundings they come into contact with the white man and with natives from other tribes, and acquire new habits as well as a taste for fine clothes, tobacco, drink, and other so-called comforts.

The white rulers of Africa have done much for the health and education of the native peoples, but the greatest of all problems confronting them is to reconcile the ideals of Western Civilization with the more primitive ways of the Africans.

South-West Africa

South-West Africa, surrendered by Germany after her defeat in the Great War of 1914-18, is about three-quarters the size of the Union. The native population, which includes tribes of Bantu stock, Hottentots, Bushmen, and people of mixed origin, numbers about a quarter of a million; but there are only 30,000 Europeans.

So arid is this territory that from the Kunene in the north to the Orange River in the south there is not a single permanent stream, though there are many watercourses which form temporary rivers in the rainy season. The

800-mile stretch of coast along the Atlantic is margined by a strip of desert from 60 to 100 miles wide. In the south of the territory, where the annual rainfall rarely exceeds 10 inches, the country is dotted with salt bush, which provides food for sheep, but as each animal needs 20 acres the farms are even larger than those of the Union. The north, where the rainfall increases to 20 inches, is a savanna region, inhabited by pastoral tribes of whom the Hereros are the most important. Under German rule the tribes were dispersed and their tribal organizations broken up, but since South-West Africa passed under the administration of the Union large reserves have been set apart for them and they have greatly increased in numbers and animal wealth. The European farmers are mainly stockmen. Sheep are reared for hides and wool; cattle chiefly for beef, which is exported through Walfish Bay in *frozen* form as the quality is not high enough for *chilling*. There is some dairying and a few co-operative creameries have been established, but owing to the dry climate the industry has not made great strides.

The chief wealth of South-West Africa lies in its minerals. Copper is mined round Tsumeb, in the north. Diamonds are obtained from the desert strip between Luderitz and the mouth of the Orange. Here at intervals along the coast are huge diamond-washing stations to which trucks of sand are brought by rail; and after the sand has been treated in the washing-plants the residue is passed through hand-sieves from which keen-eyed native workers pick out the diamonds.

As a harbour *Walfish Bay* is far superior to *Swakopmund*, to the north, whence the railway runs to *Windhoek*, the capital of South-West Africa, a thriving little township picturesquely placed on two ridges. It is linked by rail with the Union System, but the journey is as long as it is dreary: both Capetown and Pretoria are over 1,300 miles away.

EXERCISES

1. Name *three* of the chief crops grown in the Union of South Africa together with *one* important area producing each. In each case give *two* reasons explaining why the area you have named is suitable for growing the crop in question.

2. Draw up the diary of a fruit farmer living in the south-west of the Cape Province to show the work carried out on his farm during each month of the year. Start the diary in April.

3. Describe the life led by the people in a village in one of the British Protectorates in South Africa, and show how it is suited to their surroundings.

4. Explain why: (a) European cattle farmers in South-West Africa export frozen but not chilled beef; (b) wool is the second leading export of the Union; (c) most of the Indians in the Union live in Natal; (d) the railway from Capetown to the Rhodesias does not pass through the Transvaal.

5. Draw a sketch-map of South Africa. On it make and name *four* important ports in the Union; *one* port in Mozambique; *two* ports in South-West Africa; the *two* capitals of the Union; and the chief mining centre in South Africa. Shade the most thickly peopled areas. Print SPARSE over one thinly peopled region. Fill in the main railway lines connecting the places you have marked on your map.

6. Examine the lower picture shown in Plate 7. Then answer the following questions. (a) What is the name of the crop shown under cultivation? (b) Do you think it is almost ready for harvesting? Why? (c) Estimate the height of the taller stalks. (d) In what part of South Africa is this crop mainly grown? (e) Name two uses of the crop. (f) To what race does the man seen here belong? (g) Do you think this crop is grown in an African village or on a farm owned by a white man? Give your reasons.

CHAPTER XIII

AFRICAN ISLANDS

WHEN we compare the size of Africa with that of the African Islands we are apt to regard most of the latter as small. Yet Zanzibar (see p. 83), a mere dot on the map, is nearly three times the size of the Isle of Man, and Madagascar is actually somewhat bigger than France to whom it belongs.

Madagascar, which ranks after Australia and New Guinea as the largest island in the world, is separated from the mainland of Africa by the Mozambique Channel, in places 10,000 feet deep, and even at its narrowest as broad as the widest part of the North Sea. In its relief the island is a kind of miniature Africa, for the greater part is a plateau, with an average height of from 2,000 to 3,000 feet, bordered by coastal plains which are widest in the west. The South-East Trade winds bring heavy rains to the eastern side of the island, but in the southern summer, when the wind belts have shifted to the south with the apparent movements of the sun, the north-east of the island comes under the influence of the North-East Trades.

The tropical forests of the wet eastern plains are broken by plantations where rice, rubber, cacao, and sugar-cane are grown on the lower lands, and coffee and maize at somewhat greater heights. In the drier west, lying on the leeward side of the plateau, the forests are more open and resemble the better wooded parts of the savannas. The uplands, which owing to their elevation are naturally somewhat cooler than the lowlands, are used for grazing cattle. Meat is canned at *Antananarivo*, the capital, connected by rail with *Tamatave*, the chief port. Madagascar also produces graphite and phosphates.

In the Indian Ocean, some 420 miles east of Madagascar,

is *Réunion*, a French island of volcanic origin. Both the rich soil and the warm climate favour the production of sugar-cane, which is the chief cash crop both in this island and in *Mauritius*, farther east, a British possession.

Above the storm-tossed waters of the mid-Atlantic rise the British islands of *Ascension* and *St. Helena*. In the days of sailing-ships they were visited by vessels sailing before the South-East Trade winds; and until the opening of the Suez Canal were still important ports of call for ships travelling from England by the Cape to India. On both islands are cable stations on the England to Capetown route, which also touches the *Cape Verde Islands*, a Portuguese possession.

The *Canaries*, Spanish islands off the west coast of Africa, reach a height of over 12,000 feet in *Teneriffe*, the largest island, on which stands Santa Cruz, the capital. This port, like Las Palmas, the biggest town in Gran Canaria, is a coaling-station.

When, after covering 750 miles, the air liner from Lisbon to New York approaches the *Azores* passengers are usually struck by the rugged relief and the conical peaks of the islands. This reminds them (if they know geography) that, like so many Atlantic islands, the Azores are of volcanic origin. The Azores, together with the Madeira Islands, 450 miles west of Morocco, export warm temperate fruits and vegetables to Portugal, to which country both belong.

EXERCISES

1. Give an account of the African islands which belong to Britain, and state, with your reasons, which you think is the most important one.

2. Draw a sketch-map of Madagascar about twice the size of Fig. 29. (a) Shade the area that will receive a heavy rainfall throughout the year. (b) When will the sun be overhead at I? (c) Print the name of each of the crops shown in Fig. 29 over *one* area where it is probably grown. (d) Name the town marked T. What is the time at this town when it is noon at Greenwich? (e) Draw a scale for your map. Show your working.

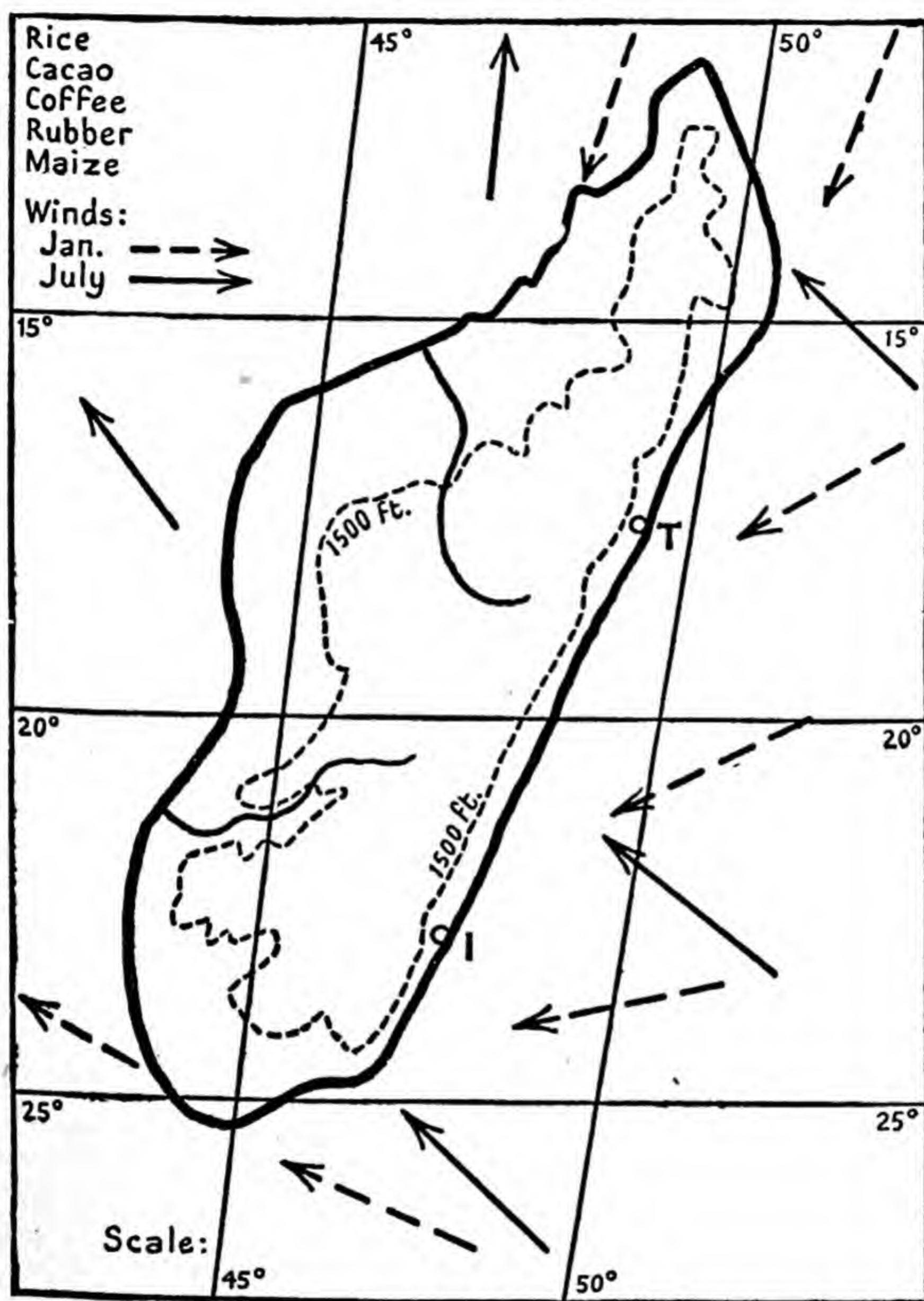


FIG. 29. Madagascar.

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AUSTRALIA, NEW ZEALAND, AND THE PACIFIC ISLANDS

CHAPTER I

DISCOVERY AND SETTLEMENT IN AUSTRALIA AND NEW ZEALAND

Terra Australis—‘the South Land’

EVEN in early times people believed that a great land mass existed far away in the south somewhere between the Pacific and the Indian Oceans. Many romantic stories were told of this unknown land, but it was not until 1598 that a Dutchman put a vague outline on a map and called it Terra Australis, ‘the South Land’.

Torres, a Spaniard, who, in 1606, sailed through the strait between New Guinea and Australia that now bears his name, returned home with the impression that the great continent he had sighted was part of a group of islands. About the same time a Dutch ship reached the Gulf of Carpentaria, where the crew landed, believing themselves to be in New Guinea. Some years later another Dutch vessel, commanded by Dirk Hartog, sailed along the west coast as far as Shark’s Bay, where Hartog scratched his name and record on a tin plate and nailed it to a post. This plate can now be seen in the museum at Amsterdam.

In 1642 Abel Tasman was sent out to explore the unknown land by Van Diemen, the Dutch governor of Batavia, in the East Indies. He first sailed across the Indian Ocean to Mauritius and then setting his course before the Brave West Winds ultimately reached the island we now call Tasmania, but which he named Van Diemen’s Land. Sailing east before the favouring winds he reached New Zealand, which he thought to be a great continent. Thence travelling

north he took advantage of the South-East Trades and after calling at the Solomon Islands returned to Batavia by way of the north of New Guinea. Thus, without knowing it, he sailed right round Australia. Later Tasman explored the

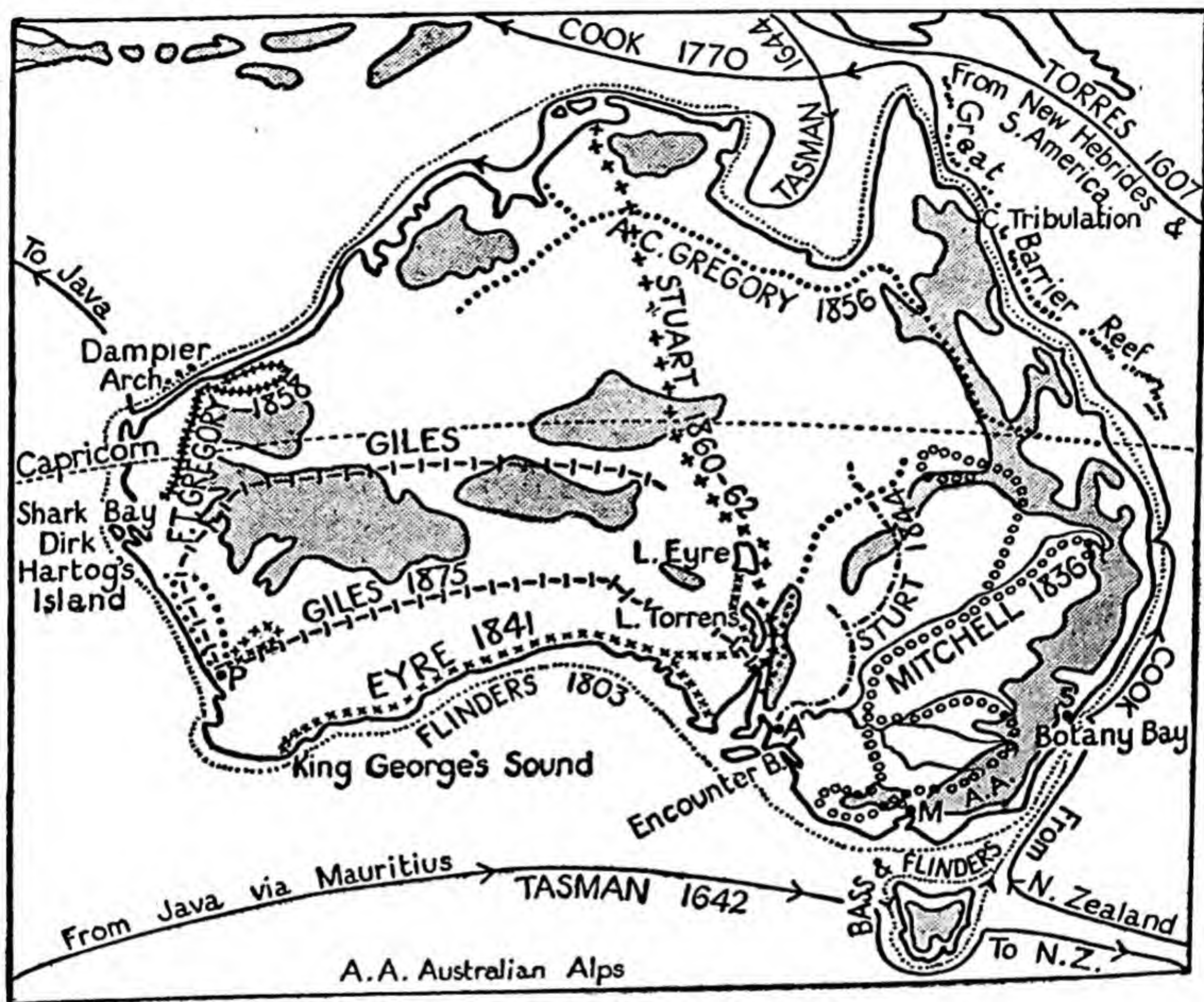


FIG. 1. Exploration of Australia

northern coasts, but he never saw the more attractive parts of the continent and advised his government that it was not worth while to colonize New Holland, as Australia was then named.

Thus it was left for Britain to take possession of the great 'South Land'. But the next step in the discovery of Australia was not taken for more than forty years. Then an English buccaneering vessel visited the north-west coast of Australia. Among its officers was William Dampier. On

his return to England, Dampier wrote a gloomy but picturesque account of his voyage and, as a result, he was sent out to make further explorations, during the course of which he visited Shark's Bay on the west coast.

Cook's Famous Voyages

Seventy years passed by before another English ship visited Australian waters. Then Captain James Cook, who was exploring the South Pacific in the *Endeavour*, reached New Zealand. He anchored in Poverty Bay, but as the native Maoris proved unfriendly Cook set off in a southerly direction, crossing Hawke Bay to Kidnapper Cape, so called because there the Maoris seized a native servant. Proceeding south along a harbourless coast backed by snow-covered mountains, Cook decided to turn north at a headland he called Cape Turnagain. Here the *Endeavour* sailed along the east coast of the North Island to North Cape, whence it travelled down the west coast and through the strait between the North and South Islands, now known as Cook Strait. Cook continued his journey round the South Island and Stewart Island and so circumnavigated New Zealand.

Leaving Cape Farewell, in the South Island, on April 1st, 1770, Cook proceeded in a westerly direction and, reaching the eastern coast of New Holland, landed at Botany Bay, so named because of the great variety of plants found there. As the coast was thought to resemble that of Glamorgan, Cook called it New South Wales. From Botany Bay the voyage was continued northward between the Great Barrier Reef and the mainland of Australia. The *Endeavour* was almost shipwrecked on a sunken coral reef near a point Cook called Cape Tribulation, because, said he, 'here all our troubles began'. How narrowly the vessel escaped destruction was not realized until she reached Batavia, when, Cook says: 'The main keel was found to be considerably injured; and several planks, near the keel, were, for the length of 6 feet, so worn that they were not above

the eighth part of an inch thick, and here the worms had made their way quite into the timbers; yet in this condition the ship had sailed many hundred leagues, where navigation is as dangerous as in any part of the world. How much misery did those on board escape, by being ignorant that so considerable part of the bottom of the ship was thinner than the sole of a shoe, and that every life on board depended on so slight and fragile a barrier between them and the unfathomable ocean!

On his second (1772-5) and third (1776-80) voyages Cook again visited New Zealand where, as the Maoris now proved more friendly, they were supplied with goats, pigs, and seeds. During the latter voyage Cook was killed by a native in the Sandwich (Hawaiian) Islands.

Two famous seamen, Bass and Flinders, in 1798, sailed, in the sloop *Norfolk*, through what is now Bass Strait and round Tasmania, thus proving that it was an island and not part of Australia.

In 1803 Flinders made his way right round Australia in the *Investigator*. Many capes, bays, and islands are called after the officers of the *Investigator*, or after places in Flinders's home county of Lincoln, or after incidents on the voyage. Flinders ranks after Cook as the greatest Australian sea-explorer.

Early Colonists

In 1778, Britain having lost her American colonies was no longer able to send convicts to Virginia and so decided to deport them to Australia. An expedition was dispatched to Botany Bay under the command of Captain Phillips. It consisted of three store-ships full of cattle, seeds, and tools, and six transports carrying 750 prisoners, both men and women. The first settlement was made at Sydney, north of Botany Bay. Many of the so-called convicts were not hardened criminals, for in the eighteenth century the laws were not only severe but often unfair: death was the penalty

for sheep stealing: transportation the lot of those who had committed quite trivial offences. Probably the majority of the prisoners owed their plight merely to their love of adventure; most of them ultimately made good and became hard-working colonists. And it is well to remember that the half-dozen shiploads of prisoners who came to Australia were small in numbers compared with those who remained in captivity in the Old Country, or had previously been sent to Virginia.

The free settlers who began to arrive in fair numbers in the early part of the nineteenth century formed the basis of Australia's population. At first they were attracted by the possibilities of grazing: later by those of gold mining. They displayed the courage of pioneers, for none but the courageous would have been willing to undertake a voyage of five or six months to the other side of the world, sailing in a vessel under the most primitive conditions with grave risks of shipwreck, fire, thirst, or even starvation. These early colonists came from all parts of Britain. They were of every class, but a large proportion were of yeoman stock, god-fearing people prepared to risk the hardships of a new land and to adapt their lives to new surroundings.

Mapping Australia

But though the outline of Australia was known it was long before the interior was crossed. Settlement was confined to Sydney and other districts along the south-east coast, for the steep escarpments of the Blue Mountains barred the way to the west (Plate 1). But in 1813 a farmer climbed up one of the boulder-strewn valleys and, making his way through a half-concealed gap, saw far below him the fertile grasslands of the Murray Basin. His route was followed by the explorer Evans, who discovered the source of the Lachlan, one of the tributaries of the Murray. Within a few years a road was made over the Blue Mountains, along which colonists from the south-east, anxious to

acquire fresh lands, drove their animals to the splendid pastures farther west.

In 1828 Captain Charles Sturt, one of the bravest and gentlest of Australian explorers, journeyed 100 miles into the interior and after great hardships discovered the River Darling, and the following year travelled from Sydney to the source of the Murrumbidgee. Sailing down this stream on a raft he and his party reached the Murray, down which they made their way to the shallow Lake Alexandrina, through which it enters the sea.

When in 1836 the province of South Australia was founded, Sturt was appointed Surveyor-General. By this time Adelaide, though only a few years old, had already developed into a thriving town against its background of hills. But the greater part of the interior of Australia was almost unknown, and Sturt determined to try to cross it from south to north. In August 1844 the citizens of Adelaide turned out to watch him depart on his new expedition. With his companions he toiled over the pitiless, blistered desert, endured tortures from scorching winds, intense heat, hunger, thirst, and scurvy. At last Sturt reached Cooper's Creek, within 150 miles of the centre of Australia. But here he broke down, and was carried back exhausted and blinded to Adelaide, where he arrived nineteen months after his departure, never to recover fully from the effects of his journey.

Another hero of Australian exploration was Edward John Eyre, who went to South Australia as a cattle dealer. Intrepid he undoubtedly was, for on one of his journeys he drove a herd of beasts from Sydney to Adelaide, a distance of 1,000 miles, in eight months. He discovered Lake Torrens and after traversing another 200 miles reached the lake that now bears his name. In 1841 Eyre made the westward journey from Adelaide to King George's Sound along the shores of the Great Australian Bight. On one occasion he and his men travelled for over 100 miles without finding

water; one of his companions was murdered by natives, and provisions almost gave out; but, undaunted, Eyre continued across the rocky barren plateau until he reached his goal.

Despite the desperate adventures of Eyre, and people like the brothers Gregory who, starting from Perth, explored the west and north of Australia, the work of discovery continued. In 1859 a reward of £10,000 was offered to the first colonist who crossed the continent. In 1860-2 the crossing from south to north was actually made by Stuart. Starting from Adelaide he travelled into the heart of the arid interior and reached the MacDonnell Range. Water grew scarcer and scarcer and this, coupled with the unfriendly attitude of the aborigines, compelled him to retrace his steps. Next year he set off again, and came within 150 miles of his objective before hardships forced him to return. Determined to succeed he made a third attempt and this time reached the north coast at Van Diemen's Gulf. His journey took ten months to accomplish and his route is now followed by the Overland Telegraph connecting Adelaide with Darwin, by the partly completed Trans-Continental Railway, and by air liners crossing Australia from south to north.

In 1861 a party of explorers made their way from Melbourne across the heart of Australia to the Gulf of Carpentaria. On their return journey they found, on arriving at Cooper's Creek, that one of their number left in charge of a food depot had departed that very day, as he thought that the explorers were dead. He had, however, left a little food buried at the foot of a tree on which he had carved the word 'Dig'. This and later expeditions showed that much of the interior was unsuited for colonization, though at a later date the sinking of artesian wells proved that considerable areas were excellent for stock rearing if not for close settlement.

In the middle of the nineteenth century the population of Australia did not exceed 250,000. But soon after 1850

gold was discovered, and thousands of men and women flocked to Australia from all parts of the world, but especially from the British Isles. In 1852 the country received nearly 100,000 fresh immigrants. Within ten years the population was almost trebled. By the beginning of the present century it was little short of two millions, and in 1940 it approached seven millions, of whom nearly all were of British descent.

Australia owes much to those daring seamen, untiring explorers, and sturdy colonists who laid the foundations of her nationhood. Colonization is not conquest. The story of the British communities overseas is the story of home-making; the mastery of fresh surroundings, at first hard and even forbidding, but later familiar and loved. The real heroes of Empire-building are the unknown settlers.

New Zealand Yesterday and To-day

Owing to its insular position and its much smaller area, New Zealand was more easily opened up than Australia. The Maoris whom Cook encountered were a Polynesian people who had migrated from the Pacific Islands. They had an extensive knowledge of the stars, the winds, and the ocean currents, and their canoes were most seaworthy craft. Describing these canoes Cook tells us that the larger ones were about 70 feet long, 5 feet broad, and $3\frac{1}{2}$ feet deep, and could carry as many as 100 men. Each side was made of three planks, one above the other, which reached from end to end, and were sewed together by string made of the flax plant. The head and stern, each of which rose 6 feet above the body of the canoe, were decorated with carved ornaments and adorned with streamers. The canoes were propelled by means of some twenty paddles about 5 feet long. In their Great Fleet the Maoris sailed over the unknown waters of the Pacific to Ao-Tea-Rua, the Land of the Long White Cloud, which is the New Zealand of to-day. But perhaps even more remarkable than their epic migration

was the way they adapted themselves to the cooler, wetter climate of New Zealand, so different from that of the warm sub-tropical islands whence they came. The temperate climate of their new home encouraged them to greater effort. Owing to the need for warmer clothing they gradually learnt to spin and weave; they began to build more substantial houses; and they discarded their weapons and cutting tools made from bones or shark's teeth for those made of stone.

As fish was one of their chief foods, the Maori villages were usually built near the coast or on a bluff overlooking a stream, and were protected on the landward side by a high palisade and a bank or ditch.

Varying from light to dark brown in colour, the Maoris have black hair, wavy or straight but not woolly like that of negroes. Their noses are broad and flat and their lips rather thick. Cook states that at the time of his visits the men were bandy-legged, owing to the fact that they were continually sitting cross-legged in their canoes. Formerly the Maoris tattooed themselves, and though the practice is rare to-day, a few of the older folk may still be seen who have decorated themselves in this way.

'The Maoris possessed no written language, but their traditions were handed down by word of mouth. They had, however, a sense of beauty and poetry which they expressed in stories, songs, and dances, and in most of them, as one would expect, the sea figured largely.'¹

It was natural that the Maoris resented the coming of the white man to their island-home, and difficulties about the purchase and occupation of the land led to wars between them and the white settlers.

In 1840, by the treaty of Wanganui, the British Government formally annexed New Zealand, and in the following year the country was created a separate colony instead of being a dependency of New South Wales. In 1845, under

¹ *Australia, New Zealand, and the Pacific Islands*: Section on New Zealand by J. H. Stenbridge.

the rule of Governor George Grey, New Zealand had a period of peace. Local Maori wars broke out, however, in 1860, and lasted for ten years, but since then the native folk have been loyal supporters of the British Crown. To-day the 80,000 Maoris form an important part of the community, taking part in the government and having equal rights with Europeans.

In 1907 New Zealand was created a Dominion, and this distant nation of the British Commonwealth, with a white population of 1,500,000 of British stock, well claims to be 'The Britain of the South'.

EXERCISES

1. Draw or trace a map of New Zealand. On it show by a dotted line Cook's first voyage. Mark and name any points of special interest.
2. Write an account of the opening up of the interior of Australia.
3. (a) How long did it take the early colonists to reach Australia? (b) How long does it take to travel to Australia to-day (i) by steamer, and (ii) by air? (c) Name the two chief occupations of the settlers, and state, with your reasons, which you think was the more useful in the long run to the country.
4. Say what you know of the Maoris. From whence did they come to New Zealand? Name *three* ways in which they adapted their life to the temperate climate of New Zealand.

CHAPTER II

AUSTRALIA: PHYSICAL FEATURES

Three Physical Divisions

AUSTRALIA is the smallest continent and the only one, except Antarctica, wholly in the Southern Hemisphere. Like South America and Africa it is a compact mass and has a relatively unbroken coast-line. In those remote ages when Australia was joined to Asia the continental shelf between the two continents was dry land. The Great Barrier Reef, composed of coral, marks the edge of the continental shelf on the north-east.

The upland regions of Australia, like the Brazilian Highlands of South America, have been planed down and worn away by prolonged weathering, which in some areas has exposed rocks containing valuable minerals.

The map (Fig. 2) shows that Australia may be divided into (a) the Western Plateau, which is separated by (b) the Central Lowlands from (c) the Eastern Highlands.

The Western Plateau

The Western Plateau, which extends through the western portion of Australia, is composed of some of the oldest rocks in the world which, for the most part, lie in horizontal layers. It has an average elevation of nearly 1,000 feet, though higher areas like Arnhem Land, the Barkley Tableland, and the MacDonnell Range bulge above the general level. The Plateau is extremely dry and, as in the Sahara, the wind has proved an active agent of denudation, tending to wear away the ridges and fill up the hollows, so levelling out the surface. As the edges of the Plateau are slightly higher than the interior, the greater part is an inland drainage area. Apart from its lower elevation, the Plateau

resembles that of South Africa, alike in its horizontal rock strata, its general relief, and its gold-bearing rocks.

Between the south-eastern corner of the Western Plateau and the South Australian Highlands lies a broad *rift valley* whose lower end has been 'drowned' and now forms Spencer Gulf and the Gulf of St. Vincent.

The Eastern Highlands or Great Dividing Range

The Eastern Highlands form a broad belt of uplands stretching along the east coast of Australia from Cape York almost to the mouth of the Murray river. These highlands are very ancient fold mountains, so changed and worn down that their fold structure has been almost lost. They rise steeply from the east coast lowlands, but slope gradually to the interior. The Eastern Highlands form the watershed between numerous and relatively short rivers draining into the Pacific Ocean, and longer but less constant streams flowing down their gentler western slopes. Despite the fact that they are nowhere of great elevation they form a barrier to climatic influences. And because they were such a hindrance to communication between the coastal region and the plains of the Central Lowlands the early settlers gave to the Eastern Highlands the apt name of the Great Dividing Range.

The Eastern Highlands do not form well-defined ranges, like the Andes, and the different parts are known by various names. From north to south run the Darling Downs, the New England Highlands, the Liverpool Range, the Blue Mountains, and the Australian Alps. The Blue Mountains rise sharply on their seaward side. Composed of hard sandstone rocks they are trenched by canyons and gorges of numerous swift streams descending to the Pacific Ocean. Between the uplands and the outliers of the Australian Alps is the Lake George Gap through which passes the railway from Sydney to Melbourne. The Australian Alps, which are also trenched by deep river valleys, culminate in Mount



3

1. THE BLUE MOUNTAINS

The Blue Mountains, west of Sydney, are cut through and through by a series of canyons in which is seen the delicate powder-blue haze, from which the mountains derive their individuality and their name. It is easy to realize what a barrier these mountains proved to the early settlers (see pp. 5 and 12)



2. CAMELS AND ARTESIAN WELLS IN AUSTRALIA

(Above) Camels, introduced from the Old World, are used for transport in the Australian desert. Here they are seen watering at an oasis. Note the light crowns and mottled bark of the eucalyptus trees. (Below) An artesian bore. Thanks to the boring of artesian wells vast areas have been made available for stock-rearing, notably in the drier parts of Australia (see p. 15)

how to obtain sufficient moisture for his crops and water for his animals. In certain areas a transformation has been wrought by sinking artesian wells which are bored to obtain water imprisoned between layers of impervious rocks, that is, rocks which do not allow water to soak through them. Such wells are sometimes sunk to a depth of 4,000 or even 5,000 feet. A hole is bored by means of a drill, and when the supply is reached pressure is released and the water rushes to the surface. A right-angled iron pipe is inserted at the head of the bore, and the water flows into a pool from which shallow channels lead it over the land.

The Great Artesian Basin, which covers about a sixth of Australia, stretches from the Carpentaria Lowlands, through central Queensland, into New South Wales. The sinking of artesian wells has enabled this region to be developed for stock rearing and has made it possible for the great stock routes, leading to the market centres or the railways, to be used even during dry periods. Other artesian basin areas are gradually being developed (see Fig. 3). Artesian water is, however, rather saline and, as a rule, is of little use for irrigation.

EXERCISE

Draw a sketch-map to show the three chief physical divisions of Australia. On your map draw a dotted line to enclose the inland drainage area. Print *Artesian Wells* over the most important Artesian Basin area.

CHAPTER III

THE CLIMATE OF AUSTRALIA

The Land of Sunshine

WHILE we are spending Christmas Day by our firesides, the Australians are surf-riding, sun-bathing, camping, playing cricket, riding, hiking, or just enjoying the brilliant sunshine and open air. For as Australia lies wholly in the Southern Hemisphere, the seasons occur at opposite times of the year to those countries, such as the British Isles and Canada, situated in the Northern Hemisphere.

Australia stretches from 10° S., the latitude of the southern savannas of Africa, to about 40° S., somewhat farther south than Capetown. As the Tropic of Capricorn almost bisects Australia, the north which lies wholly within the tropics is always hot, and the south which only stretches for about 20° south of the Tropic is never cold, except in the Highlands. On rare occasions in the winter months of June, July, and August snow falls in the south at sea-level, and in the mountains as far north as Brisbane.

The ocean encircles Australia, but its moderating effect is lessened by the fact that the continent has few openings, and because the Eastern Highlands, which lie in the track of the prevailing south-east trade winds, prevent the influence of the sea from extending far inland.

Temperature

In summer, when the sun is overhead south of the equator, most of Australia has a temperature of over 72° F., which is considerably warmer than summer in the British Isles. Temperatures are, of course, higher in the north than in the south and, owing to the influence of the sea, the coast-lands are cooler than the interior. The whole of

the continent north of the Tropic of Capricorn has a temperature of over 80°F . The extreme north, which receives heavy summer rains, and is consequently cloudy,

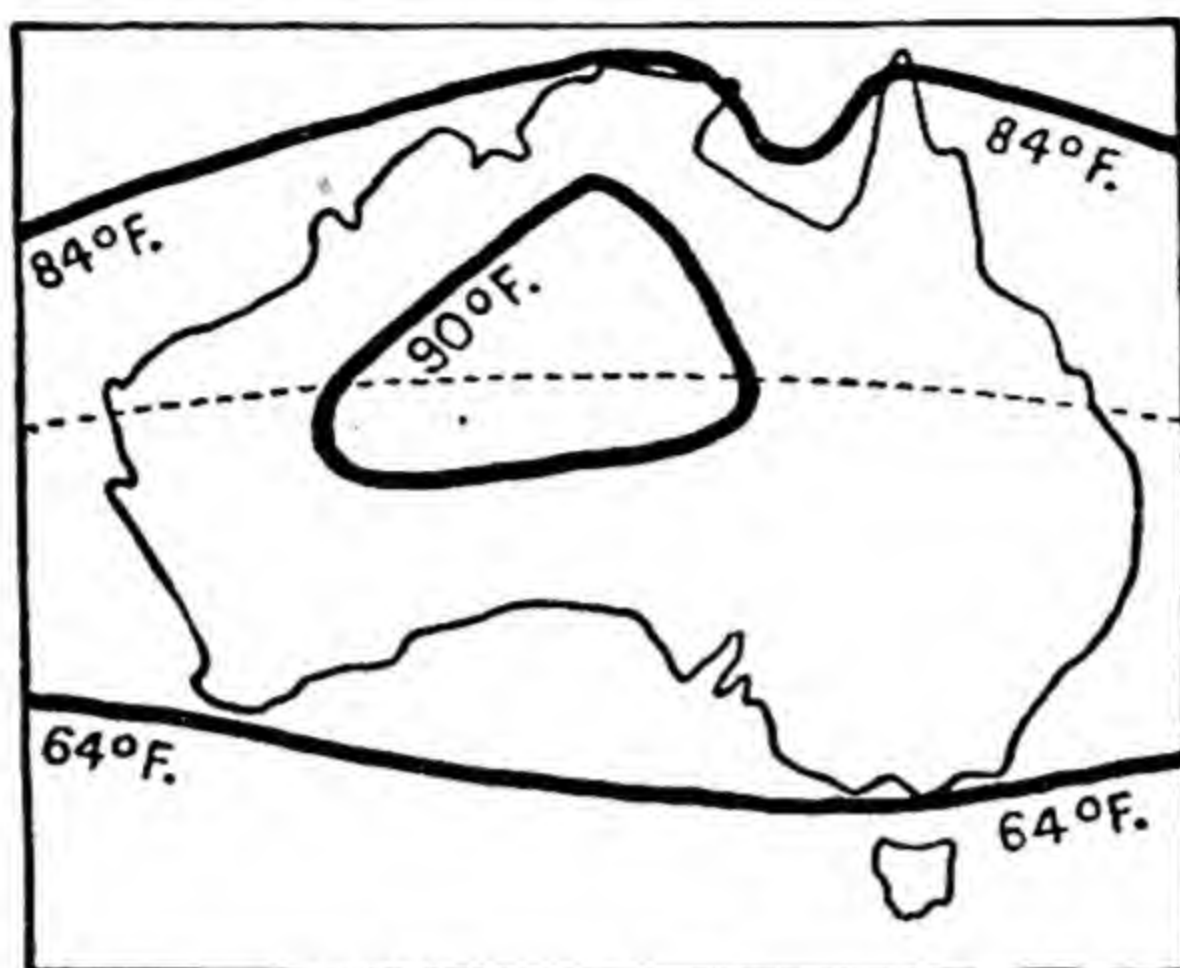


FIG. 4. Australia: January (Summer) Temperature

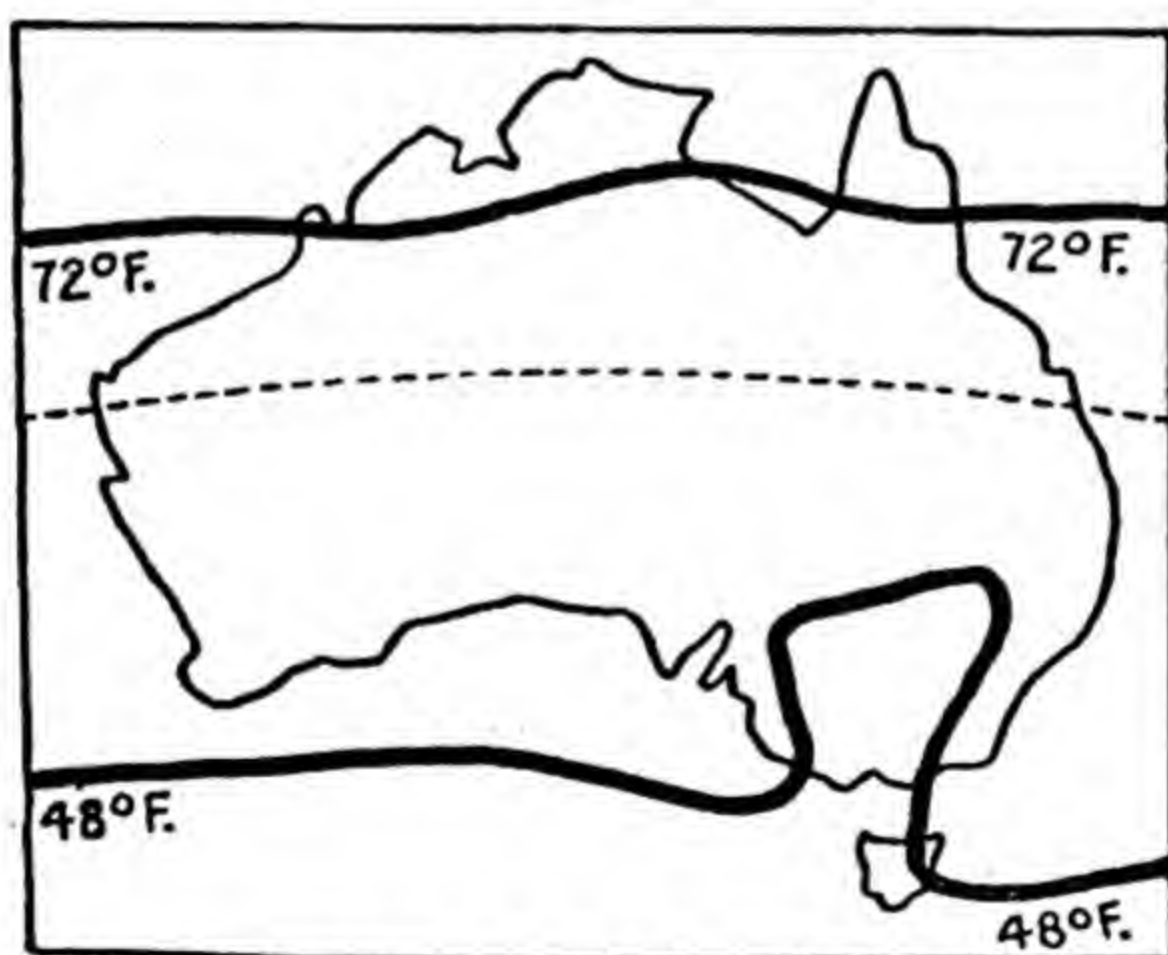


FIG. 5. Australia: July (Winter) Temperature

is not so hot as the area somewhat farther south where the cloudless sky and the dry air give free passage to the sun's rays. But in spite of the high temperature of the interior, which is over 90°F ., the dryness of the air makes the heat less felt than in the wet region farther north. In the south the summers are about as warm as in the south of Africa, or the Mediterranean Lands of Europe.

In winter the climate is cooler, but nowhere cold. North of the Tropic temperatures range from 60° F., which is about equal to the June temperature of London, to over 72° F. in the north. In the interior the winters are pleasant, the dry south-east winds temper even the hottest hours of the day, and the nights are cool and even frosty. Travellers tell us that water-bottles left outside their tents at night are often frozen solid in the morning. South of the Tropic the average temperature is under 56° F. In Melbourne, the winter month of July is about as warm as the end of April in the south of England.

Owing both to its insular position and to its more southerly latitude, Tasmania is cooler than the mainland of Australia. The summers are as warm as those of Devonshire, but the winters are somewhat milder.

Winds and Rainfall

We saw that in South America the Tropic of Capricorn crosses the Atacama Desert, and that in South Africa it cuts the Kalahari Desert. These regions, lying on the western side of their respective continents, are dry, for the South-East Trade winds blow off-shore. We also saw that on the east coast the winds, from the Tropic southward, blow on-shore, causing rain to fall on this side of South America and Africa.

Similarly, as the Tropic of Capricorn crosses Australia, much of the continent lies in the Dry Belt at all seasons. The on-shore South-East Trade winds bring rain to the windward slopes of the Eastern Highlands and the coastlands, but become hotter and drier as they pass inland. On the west side of Australia they blow from land to sea and so do not bring rain even to the coastal regions. Consequently the interior receives little rain, and over a large area the rainfall is less than 10 inches per year. Figs. 6 and 7 show that the rainfall decreases from the coast to the interior, and that the west coast, except in the north and south, receives little rain.

2. The east coast-lands, from the south of Queensland northwards, receive winter rains from the on-shore South-East Trade Winds.

3. In the north of Australia the South-East Trade Winds blow off-shore towards South-East Asia, and thus in winter the northern part of the continent is dry.

Climatic Regions

Fig. 8 shows the chief climatic regions of Australia, which closely resemble those of South Africa (see *Africa*, Fig. 21, p. 90).

Northern Australia is hot at all seasons and receives rain from the seasonal north-west winds which blow towards the land during the summer months. Thus like the savannas of Rhodesia it has summer rains, though in Northern Australia these are heavier owing to the presence of the sea along its margin.

The North-East is not so hot as the north and receives rain from the South-East Trades at all seasons, but especially in summer. This region may be compared with northern Natal and the adjacent area of Portuguese East Africa.

The South-East receives rain at all seasons, and has a warm temperate climate resembling that of Natal, though temperatures are not quite so high.

The South-West Regions have warm dry summers and mild rainy winters. Thus, like the district round Cape-town, and the Central Vale of Chile, they have a Mediterranean type of climate.

The Interior has very hot summers and warm to mild winters. Most rain falls on the margins, which receive about 10 inches a year.

EXERCISE

Examine the figures below which give the mean annual temperature and monthly rainfall at the following towns: Darwin, Sydney, and Perth. Find the towns on your map. Then answer the questions.

<i>Town</i>		<i>J.</i>	<i>F.</i>	<i>M.</i>	<i>A.</i>	<i>M.</i>	<i>J.</i>	<i>J.</i>	<i>A.</i>	<i>S.</i>	<i>O.</i>	<i>N.</i>	<i>D.</i>
A	Temp. ° F.	72	71	69	65	59	54	52	54	59	63	67	70
	Rain in.	3.6	4.4	4.9	5.4	5.1	4.8	5.0	3.0	2.9	2.9	2.8	2.8
B	Temp. ° F.	74	74	71	66	60	56	55	56	58	61	65	71
	Rain in.	0.3	0.3	0.7	1.7	4.9	6.6	6.4	5.6	3.3	2.1	0.8	0.6
C	Temp. ° F.	84	83	84	84	82	79	77	80	83	86	86	85
	Rain in.	15.3	13.0	9.7	4.5	0.7	0.2	0.1	0.1	0.5	2.1	5.2	10.3

For each town state:

- The hottest month and the temperature in ° F.
- The coldest month and the temperature in ° F.
- Range of temperature in ° F.
- Total annual rainfall in inches.
- The three wettest months with total rainfall in inches.
- The driest months with total rainfall in inches.
- Whether the rainfall is fairly uniform, or seasonal. If it is seasonal, state at what seasons (i) most rain, and (ii) least rain falls.
- State which town each letter represents.

CHAPTER IV

NATURE AND PRIMITIVE MAN IN AUSTRALIA

Plants and Trees

WE have seen that in remote ages Australia was probably joined to Asia by a 'land-bridge', but the island-continent has for so long been isolated from the rest of the world that many primitive plants and animals have survived that are quite different from those found elsewhere. In Australia, the lily, honeysuckle, and tulip are trees rather than plants. The blackberry, introduced by settlers, has found the Australian climate so genial that it now threatens to overrun farms and valleys in the South-East; while the prickly pear, brought to Australia from America, now claims half a million additional acres each year in the North.

The most typical Australian tree is the eucalyptus, of which there are several hundred varieties. These trees hang their leaves edgewise to the sun to lessen the loss of moisture through evaporation. Their yellowish trunks are mottled with patches of grey, for they shed their bark instead of their leaves. 'The gigantic eucalypts, with light and patchy crowns and a bark hanging in ragged strips, grow scattered on a floor of dry grass, where as their drooping, sabre-shaped leaves do not afford any shade the forests are quite sunny and open'¹ (Plate 2).

Natural Vegetation

Climate, especially rainfall, has, of course, a great influence on natural vegetation, which, in its turn, determines the environment of the wild animals. Climate also influences the crops Man grows and the kind of domesticated animals he rears. If we compare the rainfall maps (Figs.

¹ M. E. Hardy, *An Introduction to Plant Geography*, Clarendon Press.

6 and 7) with that showing the natural vegetation (Fig. 9) we shall see that there is a close connexion between the two. Broadly speaking, Australia consists of a desert interior surrounded by a fertile margin, which increases in richness with increasing rainfall. Thus the desert is surrounded by scrub, which merges into savannas that, in their turn, pass into woodlands.

In the *desert* with its wind-swept ridges of reddish sand, the vegetation consists of mulga (thorny acacias) and porcupine grass, though after one of the very rare rain storms the sandy, stony waste is transformed and, for a brief time, carpeted with vivid green vegetation spangled with flowers.

The almost waterless *scrublands* which surround the desert are clad with small evergreen shrubs, such as the greenish-grey sage bush, and the bushy eucalypts of the mallee scrub, whose long thin roots rise up from the ground and end in bunches of hard foliage.

Gradually the scrublands merge into poor *savannas* where eucalyptus and other drought-resisting trees grow singly or in clumps. As the rainfall increases towards the north and north-east the savannas become more wooded and the grasslands richer and more extensive. Patches of *hot wet forests* are found along the north and north-east coasts, where the summer rains last for nearly half the year and the annual rainfall is about 65 inches. Such forests also occur in tropical regions in exceptionally well-watered districts, such as river valleys and swamps.

The *warm temperate rain forests* of the south-west and south-east consist of rich grasslands with many eucalyptus trees. The south-west forests, which receive ample winter rains, are the richest timber-producing area in Australia. Among the more important trees are the jarrah and karri, two species of eucalypts. The jarrah yields a hard wood much used for paving-blocks, sleepers, telegraph poles, and in the building of docks. Karri wood is excellent for heavy constructional work.

Much of the Murray-Darling Basin is clad with *temperate grasslands*. As the rainfall decreases towards the interior, these natural pastures pass into the mallee scrub that margins the Great Australian Bight and which extends to the south-west forest area of the west coast.

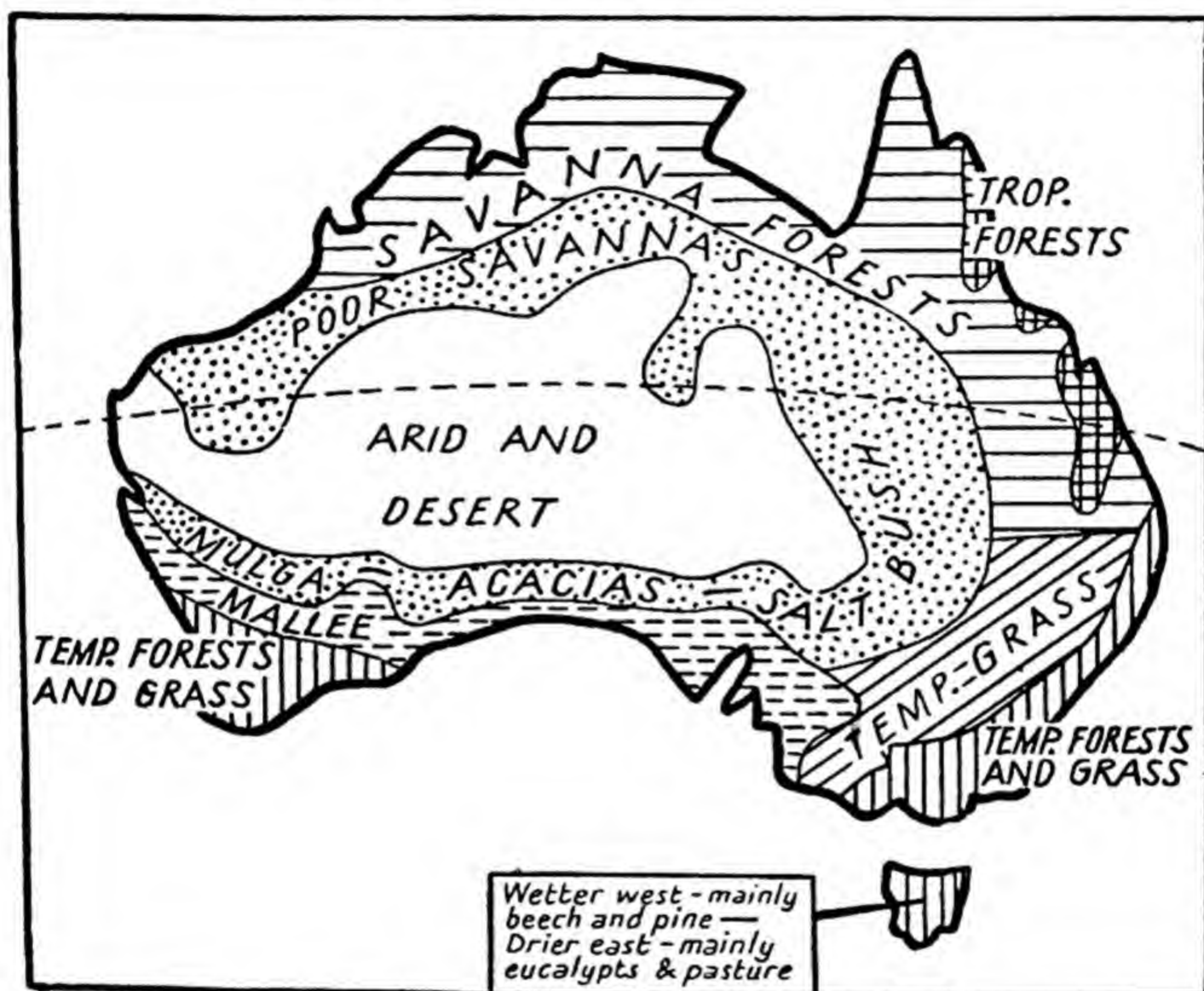


FIG. 9. Australia: Natural Vegetation

Tasmania has much forest land. In the wetter west the chief trees are beech and pine; but in the drier east these give way to eucalypts.

Wild Animals and Birds

Except for the American opossums, the marsupials, or pouch-bearing animals, are found only in Australia, New Guinea, and a few adjacent islands. The best known is the kangaroo whose home is on the savannas. Its hind legs, which are much longer than its fore legs, enable it to leap along the ground, and its long and powerful tail helps it to

preserve its balance, and with its hind legs acts as a kind of tripod when the animal is in a sitting posture. The female kangaroo, who, of course, carries her young in her pouch, presents a strange sight as she travels along at great speed in a series of leaps, of as much as 20 feet, and clears obstacles 10 feet or so in height. Most of the kangaroos feed on grass and the young shoots of bushes, but some also eat insects. Other marsupials are the wombat, which bears some resemblance to a badger and like it lives in burrows; the Tasmanian Devil, a flesh-eating animal with a taste for poultry; and the koala, a podgy, tailless, woolly animal, remarkably like a 'Teddy' bear, which lives in the trees and feeds on leaves.

Among the egg-laying mammals is the platypus, or duck-bill, which has a bill like a duck and webbed feet. Owing to the damage it does to the banks of rivers it has been destroyed in large numbers. The echidna, the Australian ant-eater, another egg-laying mammal, is an extraordinary animal, about a foot long, resembling a hedgehog. It is an amazing sight to see it attacking an ant hill with its enormous claws and then, when success has rewarded its efforts, sticking out its tongue and licking up the ants.

The flying foxes, which live in the coastal forests and mangrove swamps of North-East Australia, are really enormous fruit-bats: some of the larger specimens actually have a span from wing tip to wing tip of over 4 feet. They can use their wings as fans when the weather is hot, and as mackintoshes when it rains. They clamber up branches with the aid of their clawed thumbs, with which they also spear fruit crushing it to a pulpy mass in their mouths. Though they prefer fruit and frequently raid orchards, the flying foxes feed on the flowers of eucalyptus trees when fruit is not available. Many of their colonies, called 'camps', scattered at intervals of about 30 miles, along a 1,000-mile stretch of coast, contain upwards of a quarter of a million 'foxes'. During the day they roost in the trees, hanging

head downwards, but towards evening the flight to the feeding-grounds begins. Then the sky appears to be blotted out, and the air is filled with the noise of beating wings. But the 'foxes' have their enemies. Pythons and monitor lizards, about five feet long, climb up the trees and devour their young when the 'foxes' are roosting, and crocodiles snap them up when they skim down to the rivers to drink.

The dingoes of the Australian aborigines are supposed to have been introduced into the continent by this primitive people, but to-day, even in the bush, most of these dogs are mixed with European strains. Early European settlers introduced cats and rabbits which bred rapidly, partly because none of the indigenous animals preyed on them, as they were mainly herbivorous. Numbers of cats—mostly of the tabby variety—are now found wild in the bush where they are regarded as a delicate dish by the aborigines. Rabbits spreading throughout the country eating up sheep pastures became a national danger. Hunting, trapping, and poisoning met with little success. Finally the sheep paddocks and the farms were enclosed with rabbit-proof fencing which proved effective, but woe betide the farmer if rabbits do get into his paddocks, for ten rabbits eat as much as one sheep. In New South Wales alone there are nearly 50,000 miles of rabbit-proof fencing. In recent years the animals have been killed for 'frozen rabbit', and their skins are exported to be used for making felt hats. Some of the camels (Plate 2) introduced for transport into the dry areas, and the Indian buffaloes taken to tropical regions for farm work, have run wild.

Many of the Australian birds are quite distinctive. The emu, a flightless bird about the size of the ostrich, lives on the savannas where it feeds mainly on grass, and the cassowary, though also unable to fly, can run at a great speed. The prevailing green colour of the parrots, which are found nearly everywhere, enables them to blend with the foliage.

Among the birds introduced into the continent is the starling, which was brought to kill insect pests but remained to rob orchards. Thus in the case of both the rabbit and the starling Man's attempts at improving on Nature's arrangements have not been successful.

Children of Nature in Central Australia

Imagine an area somewhat larger than England and Wales whose scattered population does not exceed that of a fair-sized town, and you have a rough idea of the size and number of people in the Central Aboriginal Reserve, where live many of Australia's 55,000 aborigines. The home of these Children of Nature is a plateau about 1,000 feet above sea-level, stretching south from the Tropic of Capricorn. The reddish sand dunes, broken here and there by rocks, are clad with widely spaced mulga trees and stretches of prickly porcupine grass. For their wants, which are few, the aborigines rely entirely on their surroundings. They grow no plants. But the men are skilled hunters and, with the help of dingoes, track kangaroos, cats, and rabbits which fall an easy prey to their spears. The women, aided by the children, catch lizards, and small birds, and collect grubs, berries, bulbs, and succulent roots. In the afternoon, when the men are cooking the communal meal for the tribe, they place their wooden *mimbus* (bowls) on their heads, and go off to the rock holes to fill them with water.

The warm climate makes clothes unnecessary, but at night and during the cool season the people gather round their fires which they always keep burning; and when travelling they take fire-sticks.

The aborigines live in small groups, sharing their food and helping one another when necessary. Apart from spears, boomerangs, digging sticks, *mimbus*, and other implements, these simple folk have no property, and when they move on they carry their possessions on their heads or in their hands.

As soon as supplies are exhausted in one district they leave it for another, always travelling by day, and camping at night near a water hole. They usually shelter beneath trees or rocks, but sometimes during the cool season or when it rains they build wurlies, as the rough shelters made of boughs and covered with twigs and leaves are called.

To these people contact with the white man has brought little good and often many ills; and in the words of a noted Australian explorer, 'their greatness lies in the balance they have achieved with nature'.

EXERCISES

1. (a) How do you account for the fact that primitive types of animals have survived in Australia? (b) Name *four* such types. (c) Describe how *one* wild animal found in Australia is adapted to its environment.

2. Write an account of a visit to the Central Australian Aboriginal Reserve. In your account try to show how the aborigines lead lives that are natural to their surroundings.

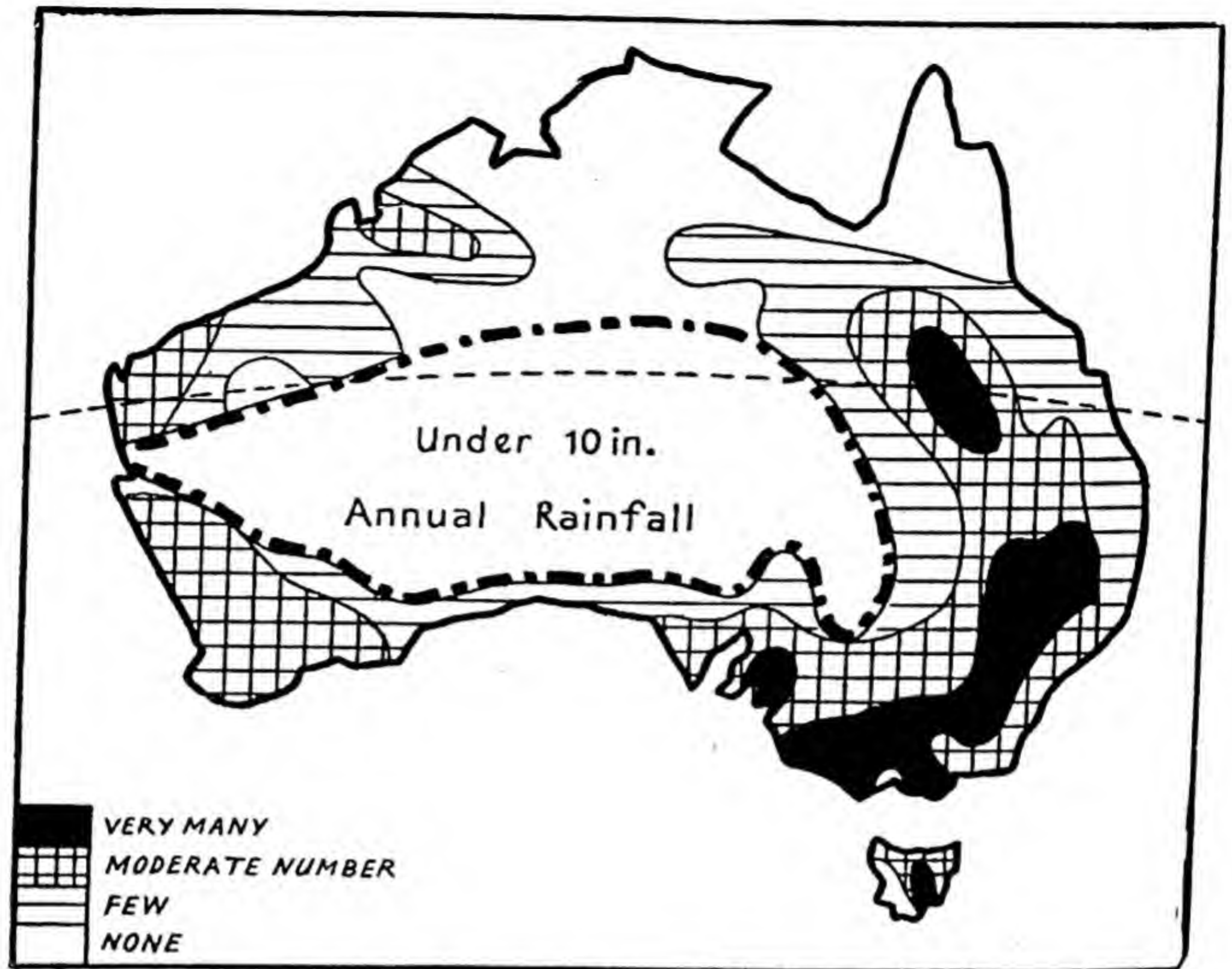


FIG. 10. Australia: Distribution of Sheep

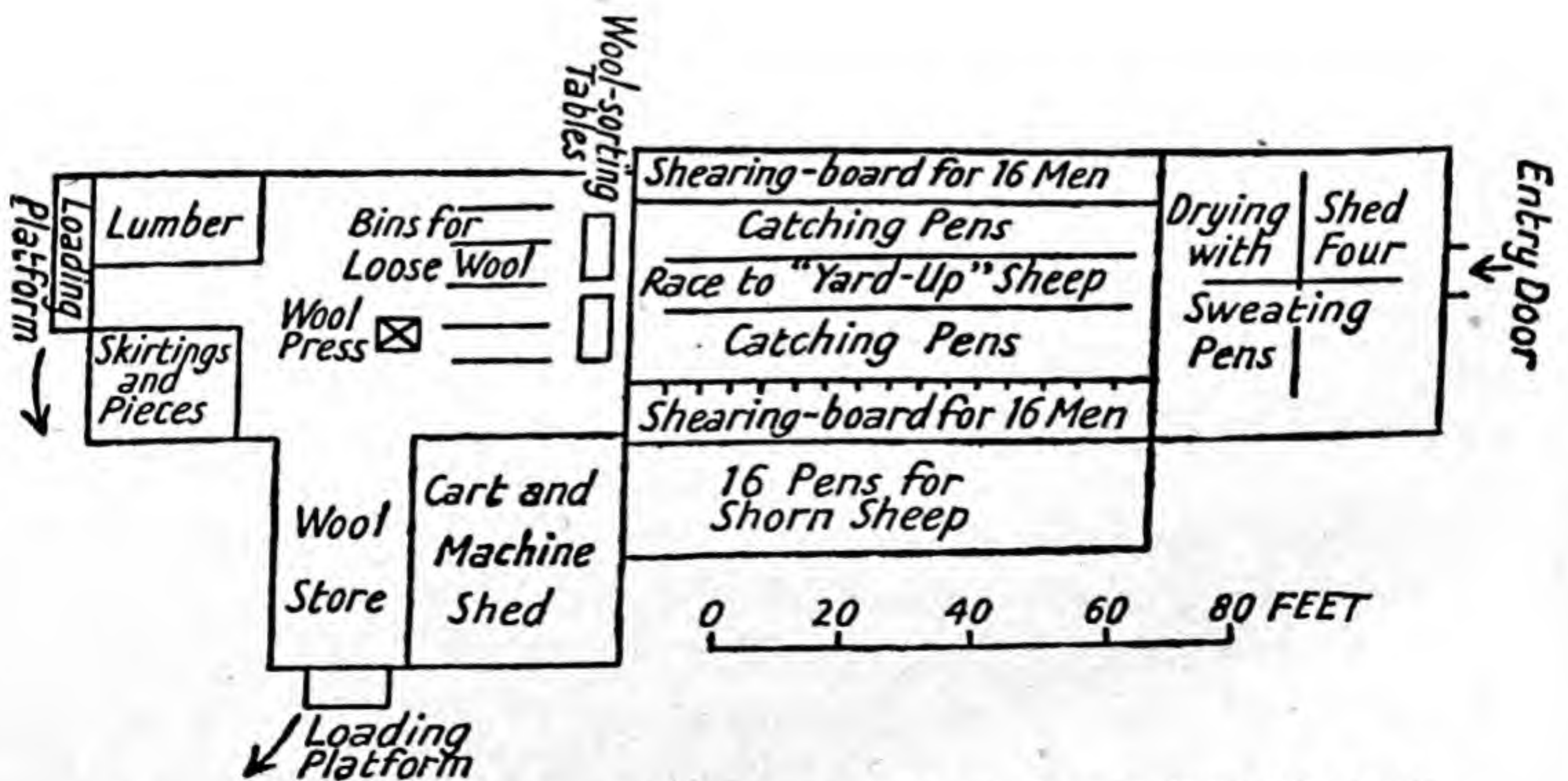


FIG. 11. Plan of an Australian Wool-shed (after Griffith Taylor)

CHAPTER V

AUSTRALIA'S WORKERS

'A White Australia'

THOUGH almost half of the Australians live in the five big cities, thousands are engaged in raising sheep and cattle, growing wheat and fruit, or in mining. It is the farmers and miners—the primary producers—who furnish work for middlemen and exporters in the cities, and who provide the bales of wool; bushels of wheat; mutton, beef, butter, and hides; apricots, pears, and peaches; and the minerals upon which the prosperity of the country depends. But all jobs, whether on sugar plantations in the tropical north-west, in lumber camps in the south-west, or in the mines, are done by people of European descent, for the inhabitants of the Commonwealth wish to retain their continent as 'A White Australia'.

Sheep Farming

With her 114 million sheep Australia is easily the largest wool producer in the world. Sheep thrive best in regions where the rainfall is from 10 to 20 inches a year, and the summer temperatures are not too high. For these reasons few sheep are found along the east coastlands where the damp climate is better suited to dairy cattle; or in the interior where the annual rainfall is less than 10 inches; or in the tropical north. The main sheep-grazing region lies on the leeward side of the Eastern Highlands, where it stretches from the Murray Basin northward into Central Queensland (see Fig. 10). New South Wales alone raises nearly half the sheep in Australia. A typical sheep station in this state ranges from 1,000 to 2,000 acres, and carries one sheep to every 4 acres. The *selector*, as the owner of these moderate-

sized farms is called, grazes sheep both for mutton and wool, and usually devotes part of his land to wheat. In the drier areas, nearer the interior, some stations exceed 50,000 acres, but they only carry about one sheep to 20 acres, and the animals are bred almost entirely for wool. The tendency is, however, to split up the huge holdings and divide them among a number of farmers.

The *squatter*, or large landowner, devotes his entire attention to sheep. He lives in a one-storied wooden house, often surrounded by a verandah, and roofed with corrugated-iron, which is cheap, easily transported, and catches water well. Water is raised by windpumps, and some farmers generate their own electricity. Near the house are the quarters of the men, outhouses, stables, the garage, the shearing shed (see Fig. 11), and the blacksmith's shop.

The station is divided into paddocks enclosed by rabbit-proof fencing.

The sheep farmer has little need for machinery, and the chief duties of the boundary riders, or stockmen, who spend hours each day in the saddle, are to inspect the animals, examine the fences, and oil the windpumps. As the pastures are not thick, owing to the light rainfall, some of the paddocks are usually left empty for a time to allow the grass to grow.

Spring is a busy time. After the sheep have been rounded up they are herded in batches into a large covered shed, called the drying pen, where they remain until their wool is quite dry. They are then driven into the shearing shed along each side of which stand the shearers. Each man takes a sheep between his legs and, using electric clippers, clips off the fleece, which is thrown upon a long table to be graded and sorted. Shearing is specialized work, done by bands of men who travel from farm to farm: a skilled machine-shearer can shear some 300 sheep in a day.

The fleeces are packed into bales. These are piled on ox-wagons or motor lorries, which take them, often many miles,

to the railway, whence they are dispatched to wool markets. Sydney and Melbourne are the greatest wool markets in the world, though London is still an important centre. To the Australian markets come buyers from many countries, especially from Great Britain, the United States, Japan, France, and Belgium. A growing proportion of the wool is used in Australian textile factories.

The introduction of cold storage revolutionized sheep farming in Australia, just as it did cattle farming in Argen-

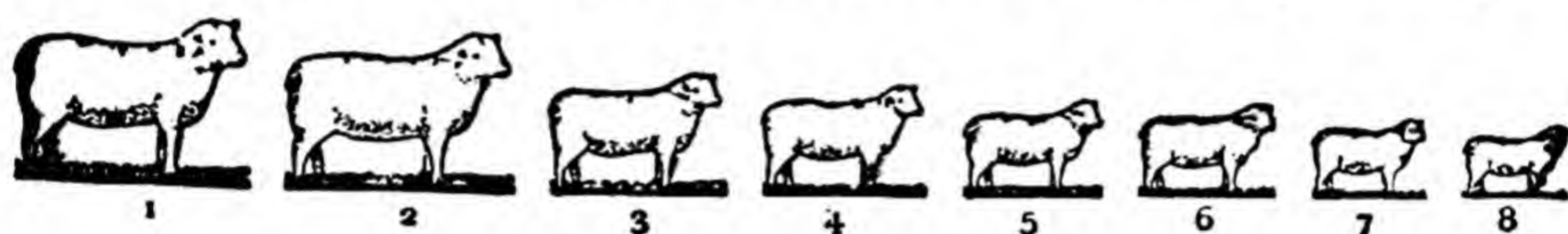


FIG. 12. Comparative Number of Sheep

1. Australia; 2. U.S.S.R.; 3. U.S.A.; 4. South Africa; 5. Argentine;
6. New Zealand; 7. British Isles; 8. British India

tina. Before this important commercial discovery meat, butter, eggs, and other perishable goods could not be exported from Australia and other distant countries to markets in thickly peopled countries like the British Isles. But with the advent of ships fitted with refrigerating chambers Australia soon built up a great export trade in frozen mutton and lamb which, together with chilled and frozen beef, are sent mainly to Great Britain.

By-products play an important part in sheep farming as they do in most modern industries. Sheep skins are tanned for leather; the horns and hoofs are used for buttons; the fat is converted into tallow for making soap and candles; trimmings of the skin are sent to glue factories, and from the intestines sausage-casings are made.

Cattle Farming

Of the thirteen million cattle in Australia, about three-quarters are reared for beef and the rest for dairy purposes. Cattle require more moisture, but are better able to

withstand high temperatures than sheep and so can be grazed farther north. Compare Figs. 10 and 13. Nearly half the cattle are bred in Queensland, where in the Great Artesian Basin vast numbers of beef cattle are reared as well as many horses.

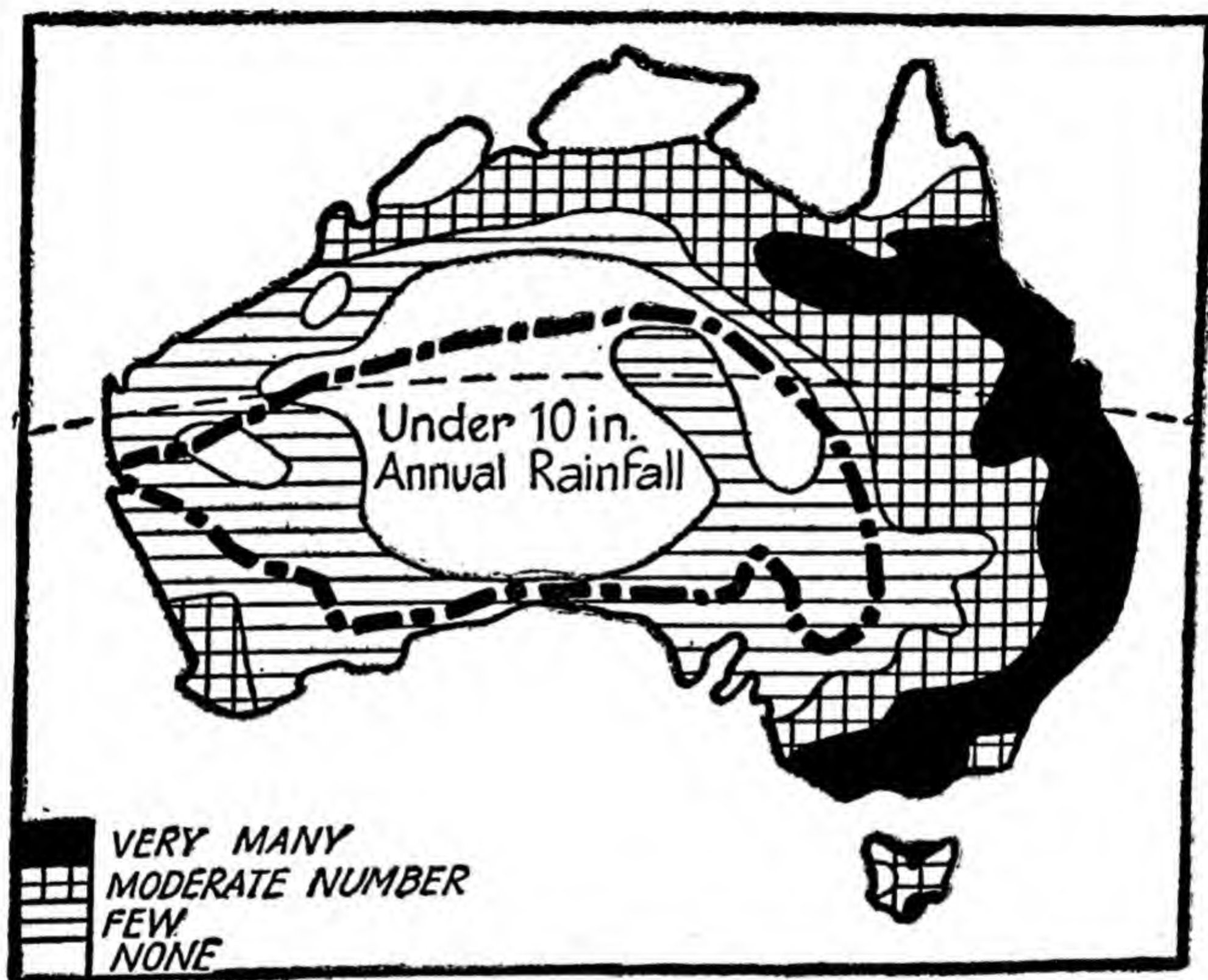


FIG. 13. Australia: Distribution of Cattle

The stockman covers hundreds of miles on his journeys. Much of his time is spent examining the wire fences, seeing that none of the animals is injured and that the cows and their calves are in good condition, and inspecting the artesian wells and other water-supplies to see that they are abundant and clean, and making sure that the cattle have enough pasture and do not eat poisonous plants. At other times, especially in autumn, he rounds up the beasts. Then he helps to drive them along the great stock routes to the nearest railway, by which they are dispatched to Rock-

hampton and other ports. The 'overlanding' of the cattle is a job that requires great skill and judgement on the part of the drovers. The animals are driven along the stock routes by easy stages which depend, of course, on the amount of pasture available and the water-supplies, that are obtained mainly from the artesian wells.

Many dairy cattle are grazed on the well-watered plains along the east and south-east coasts. Most of the milk is made into butter. Somewhat less than half the butter is consumed in Australia and of the remainder the greater part is sent to Great Britain, though some is exported to the Dutch East Indies. Much of the skim milk is used on the farms to feed pigs of which there are somewhat more than a million in the country, about two-thirds being found in the coastal belt of New South Wales and Victoria.

Wheat: the Leading Crop

Since the beginning of the present century the amount of land in Australia devoted to agriculture has almost doubled. The dry sunny climate is excellent for wheat, which alone occupies 7 out of every 10 acres of cultivated ground, and so much is produced that Australia ranks as the third wheat-exporting country in the world. The leading wheat-growing area is on the leeward side of the Eastern Highlands, where it extends from Adelaide, in South Australia, eastward through Victoria, into New South Wales. In this region the annual rainfall varies from 20 to 30 inches, but wheat is also cultivated in drier districts, though none is grown where the annual rainfall is less than 10 inches (see Fig. 14).

The wheat farmer is more mechanically minded, and probably more scientific in his outlook, than the stockman; for he is constantly using machinery, must select fertilizers and grow types of wheat best suited to his soil, and also practise rotation of crops. But as land is relatively cheap his methods are extensive rather than intensive, and though

Australian wheat is of high quality the yield per acre is only 10 or 12 bushels compared with 35 in the British Isles. Many *selectors*, as we have seen, combine wheat growing with sheep rearing. The sheep keep the land in good condition by manuring it and by packing it down with their hoofs. They also clear fallow land of weeds, and crop young wheat when it grows too quickly.

In some of the drier parts of the wheat belts the fields are allowed to lie fallow for a season. This method, coupled with frequent tillage, helps to preserve the moisture and gives the soil a rest. The actual effect of *dry farming*, as it is called, is to allow twelve to fifteen months' moisture to be applied to one crop.

In autumn motor tractors, or ploughs drawn by five or six horses, are driven across the land. Then after the ground has been harrowed, a process which also helps to preserve the moisture, the seed is sown by a combined seed-drill and fertilizer, which, as its name implies, not only sows the seed but spreads the fertilizer at the same time. The autumn rains are succeeded by the dry, mild, clear and sunny days of winter. Even in this season there is some growth, and in spring the wheat shoots up rapidly. Harvest-time comes well on in the summer. Work starts about 8 o'clock, as soon as the sun is well on the crop, and, with short breaks for meals, the teams are kept busy until sunset, or even later.

On many of the large farms the Combined Harvester is used. This wonderful machine, an Australian invention, gathers the grain as it goes along, threshes and winnows it, and delivers it into a bin ready for bagging. Where the crop is heavy the machine will bag 100 bushels an hour. While they are awaiting transport the sacks are stacked in great piles in the fields, for there is little danger of rain.

Vast quantities of wheat are exported from Adelaide, Melbourne, Sydney, and smaller ports, where hefty men, called *lumpers*, hoist sacks of wheat on to conveyors, whence

the grain is shot into the holds of vessels (Plate 3). In some cases the grain is conveyed to Europe by *sailers* travelling by way of Cape Horn. Their running costs are less than those of steamers and as *sailers* do not travel via Panama, they have no canal dues to pay. Hence they carry the grain

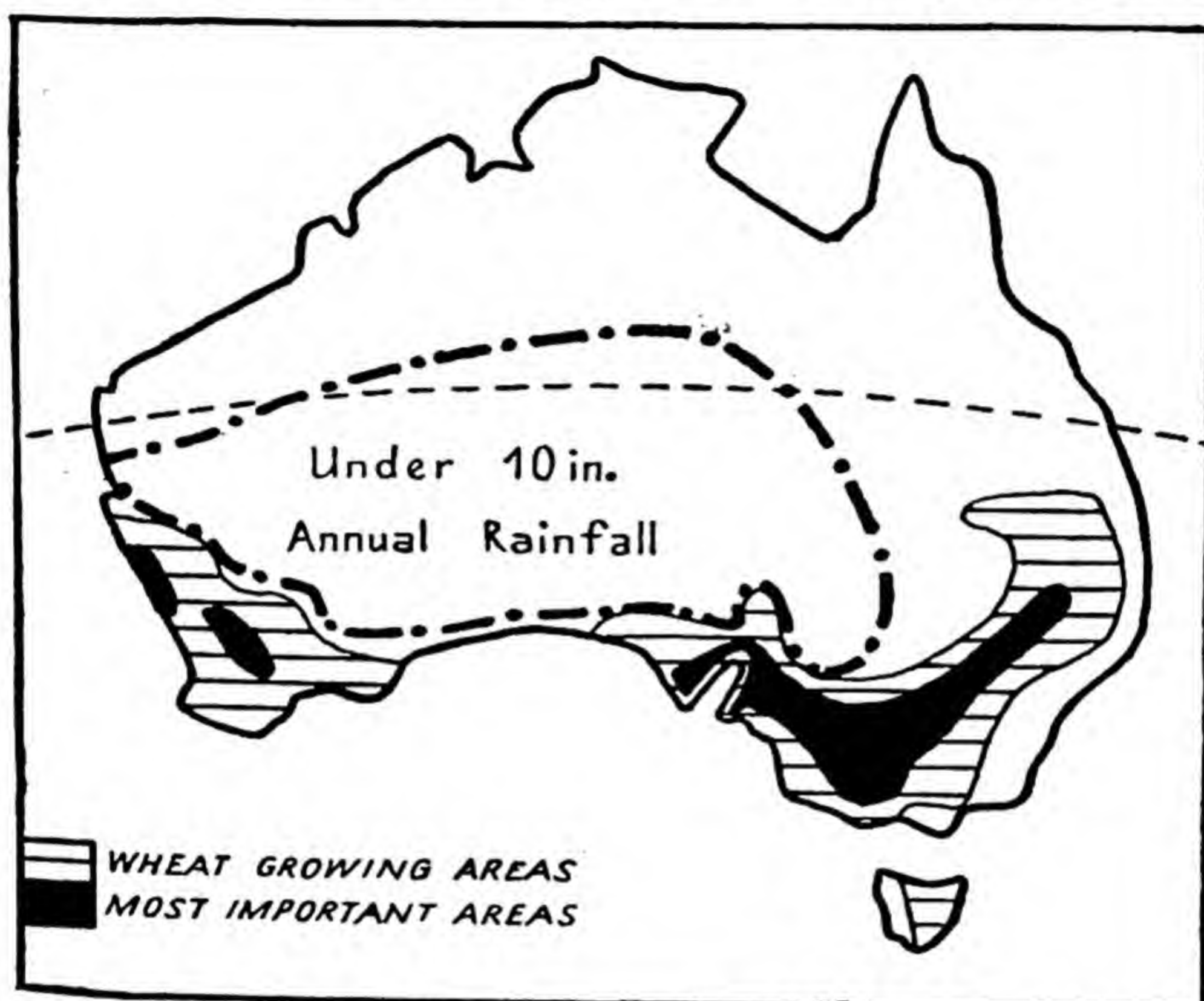


FIG. 14. Australia: Distribution of Wheat

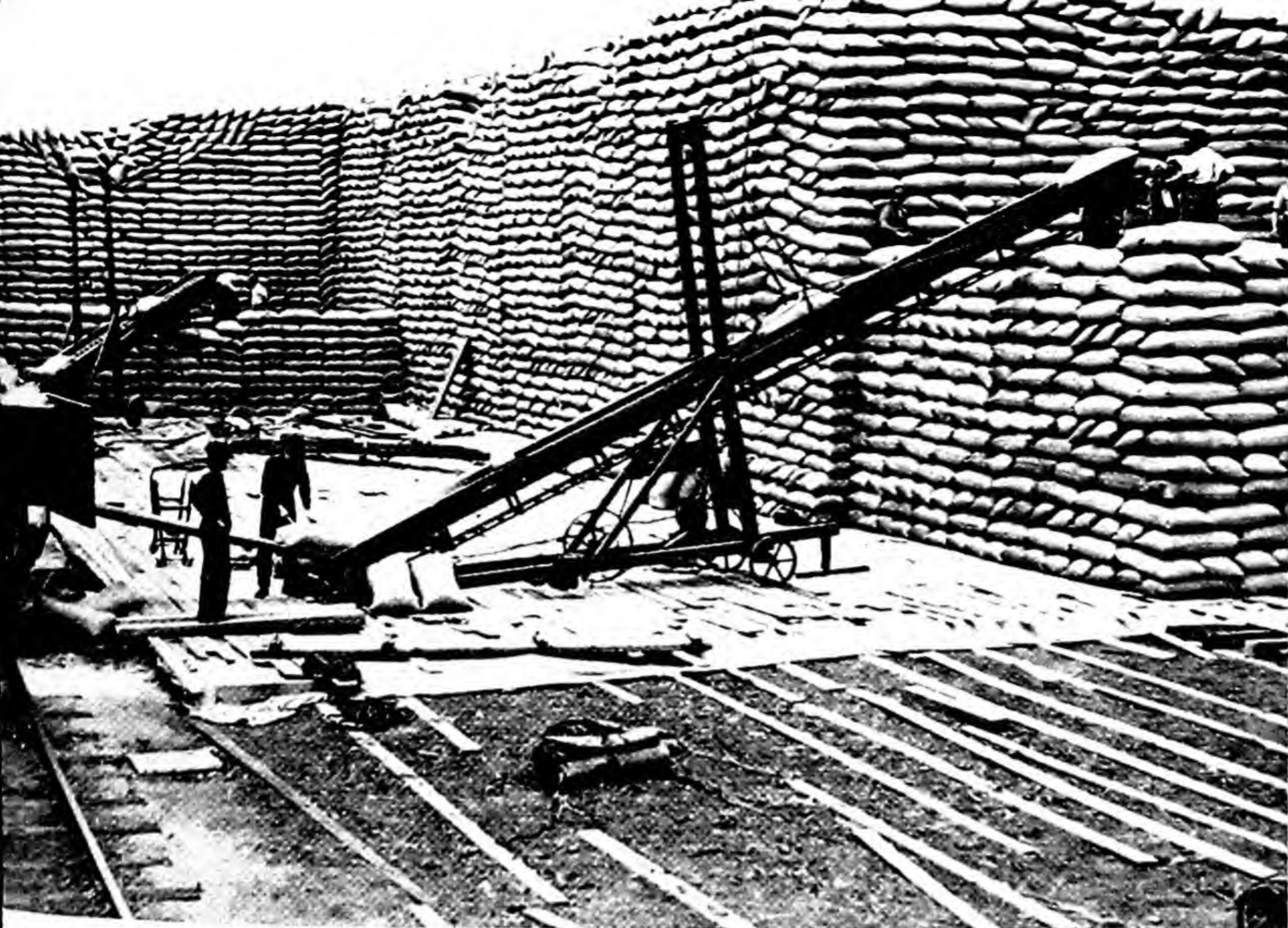
cheaply. The annual race of these grain ships is even more exciting than that between 'ocean greyhounds' striving to gain the 'blue riband' of the Atlantic. The deep-laden vessels slip quietly into the open sea on their 16,000 mile journey. Driven before the westerlies they speed under grey skies and over the grey waters of the South Pacific into the fierce gales round Cape Horn, where the winds howl and shriek through the rigging, and roaring seas break over the decks until the rolling ships tremble under the shock. Thence the often battered vessels enter the more peaceful waters of the Atlantic, and after negotiating the Calms of

Capricorn sail before the South-East Trades into the Doldrums, where progress is, at the best, slow. Then, tacking against the North-East Trades, they enter another belt of calms—the Horse Latitudes—before picking up the westerlies which carry them towards the English Channel.

The bulk of Australian wheat is sent to the British Isles and some is exported to South Africa and other countries. The wheat is much in demand by British millers on account of its hardness, and because it yields a high proportion of flour of excellent colour.

Fruit and Sugar-cane

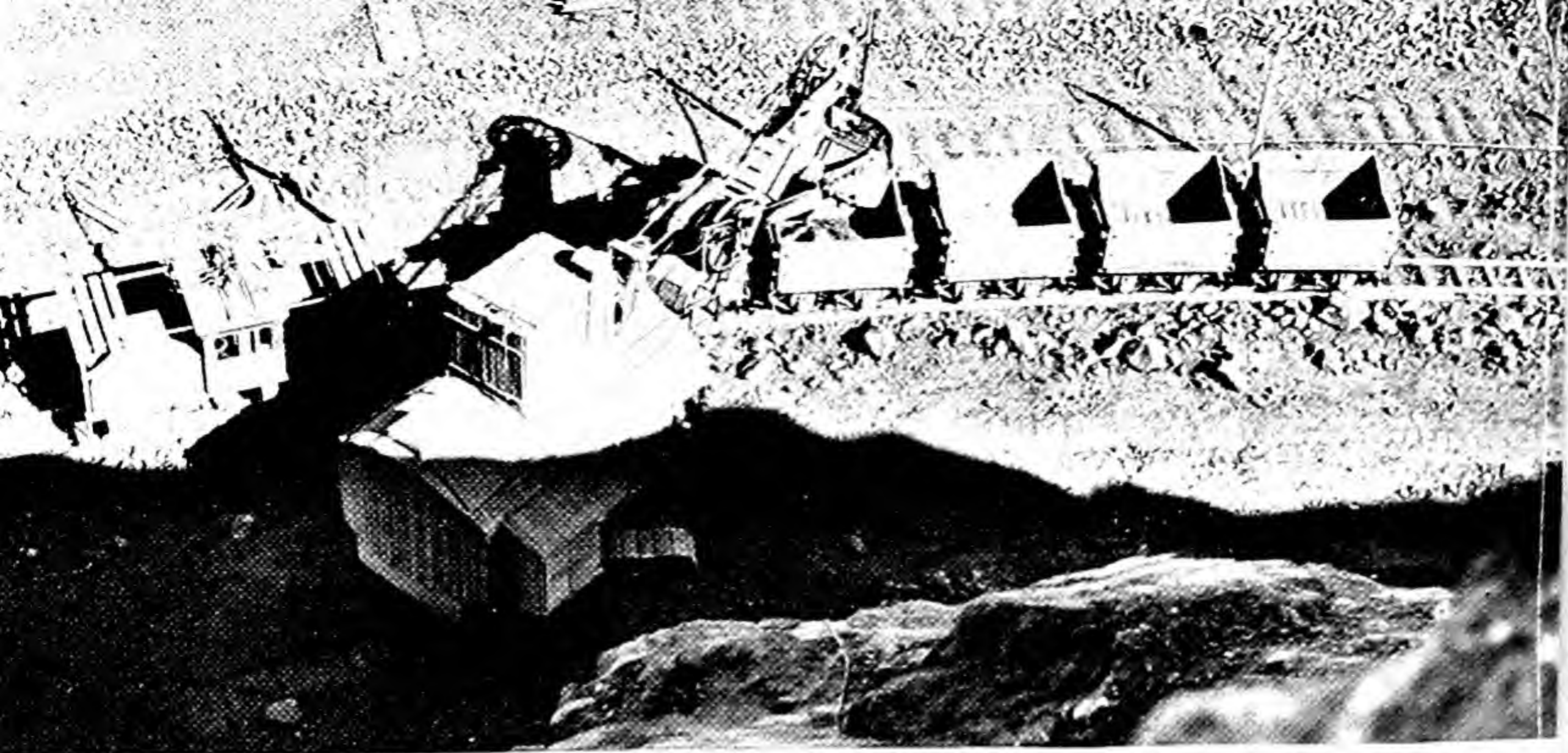
The mild sunny climate of Australia favours fruit-farming. Much fruit is cultivated on irrigated lands in the Murray Basin, where apricots, peaches, apples, and pears are grown. In spring the orchards, with their irrigation channels, are a beautiful sight with their lovely blossoms and promise of fruit to come. Some of the fruit is placed on trays and dried in the sun; much is canned for export; and a considerable amount is made into jam. On the warm northern slopes of the hill-sides round Adelaide and on irrigated lands in the Murray Basin are many vineyards, where in autumn luscious grapes hang heavy on the vines. Some are dried for raisins and currants, and in the Adelaide district they are pressed for wine. Tasmania, with its cooler, wetter climate, produces half Australia's apple crop, which arrives in the British Isles in the spring when other supplies are beginning to fail. There are many orchards of oranges and other citrus fruits along the coast-lands of northern New South Wales, while pineapples are grown on the tropical lowlands of Queensland. At widely spaced intervals along this coast are plantations of sugar-cane. A little over half the output of Queensland is now sufficient for the entire needs of Australia both for household use and for the jam factories. The surplus sugar is exported chiefly to Canada and Great Britain.



3. BREAD, MUTTON, AND WOOL FOR BRITAIN

(Above) A scene at Melbourne docks. The sacks of wheat, which are being loaded from the trucks on the left, are carried by the conveyor to the top of the growing pile which will soon find its way into the hold of a vessel bound for England. (Below) Mustering sheep on a New South Wales Station. The greater part of the wool and mutton will be exported to England (see pp. 31-3)





4. AN OPEN-PIT MINE AND A HYDRO-ELECTRIC POWER STATION

(Above) A mechanical shovel loading iron ore into a train at Iron Knob open-pit mine, South Australia, the principal source of iron ore in the Commonwealth (see p. 41). (Below) A Power Station in Tasmania which, owing to its abundant rainfall, has ample supplies of water power. The water runs down through the pipes to the station, whence the spent water passes out through the tail race. The transformer is seen on the left of the power station (see p. 54)

Mining

Before 1850 the white population of Australia was less than half a million, for few people wished to undertake the long and arduous voyage, or to settle in this remote land

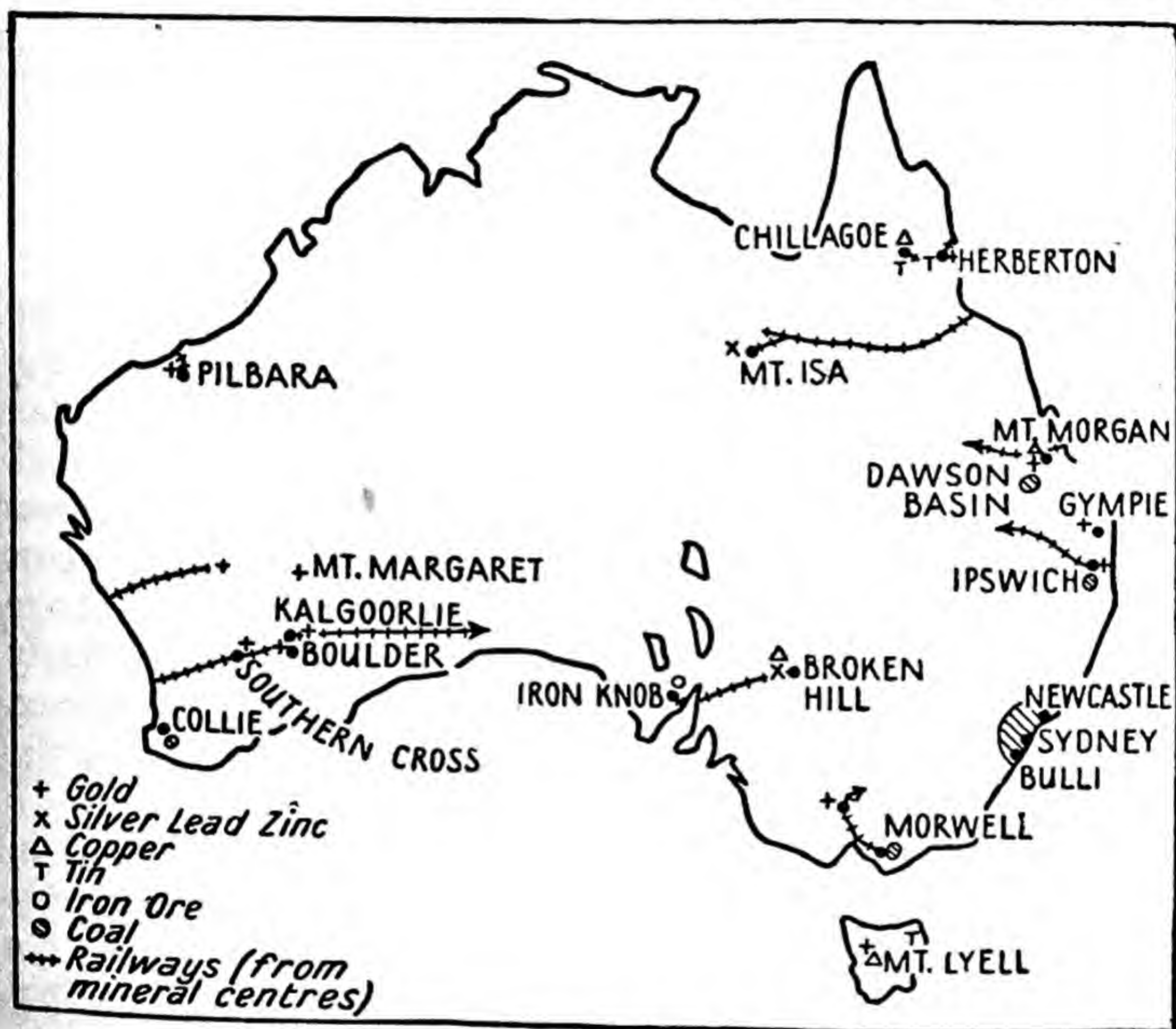


FIG. 15. Australia: Distribution of Minerals

far from their kith and kin. Then in 1851 a miner who had returned from California discovered gold near what is now the town of Ballarat. A 'gold rush' started and men flocked to Australia from many lands. They underwent all kinds of hardships. There were no comforts to alleviate their incessant toil of washing the silt and gravel in the hope of obtaining at least a quantity of gold-dust, or a valuable nugget—lumps of gold weighing 5 or 6 lb. which were not

uncommon. The miners lived in rough huts and tents, for no one was willing to spend his time building a decent house when he might gain a fortune from the soil in a single day. Food being difficult to obtain, prices rose to fantastic heights; but men who were lucky not only gained but spent money freely. Other gold-fields were discovered and within ten years gold worth over £100 million had been obtained. Population increased rapidly, and many who failed in their quest for gold turned their attention to farming and other activities. Then began the true prosperity of Australia.

The scout, as the old type of prospector is called, with his pick and canvas water-bag, still wanders over promising districts looking for surface rock that may indicate the presence of gold or some other valuable ore. His is a practical knowledge gained through long experience, and luck plays a great part in his finds. To-day¹ he may be almost penniless, living on damper¹ and kangaroo meat: to-morrow he may strike a find that may bring him a fortune. But the modern prospector is a trained geologist who tests likely ground by borings over an extensive area. Like the miner, he is probably employed by a large company that has the capital necessary for working a modern mine.

Gold is still an important export of Australia and in recent years the value has increased owing to the rise in world prices. Nearly three-quarters of the Commonwealth's gold is obtained from Western Australia, where the principal mines lie in the desert area of the south-west. In this region centres, such as Southern Cross, Boulder, Mount Margaret, and Kalgoorlie where mining has recently revived, lie on the main or branch lines of the Trans-Continental Railway from Perth to Port Augusta. There are also gold mines in Victoria and the Eastern Highlands.

Broken Hill in New South Wales is famous for its mines which yield silver, lead, and zinc as well as copper. Tin is obtained in the north-east of Tasmania and in Queensland.

¹ Bread made of flour and water and cooked in hot ashes.

Most of the iron-ore deposits lie off the coal-fields: the most famous are those at Iron Knob, in the Eyre Peninsula of South Australia (Plate 4).

At the present time the value of the coal output of Australia is about equal to that of gold, and it is of greater permanent value to the country, for it supplies not only fuel for export and domestic use, but also for building up manufacturing industries and so helping with the general development. The *New South Wales Coal Basin*, the principal one in the Southern Hemisphere, extends from Sydney, north to Newcastle, and south to Bulli. As the coal lies close to the coast it is easily exported and is convenient for bunkering ships. Some coal is also mined in the south-east of Queensland, in the south-west of Western Australia; and brown coal (lignite) is obtained from Gippsland in the south-east of Victoria.

EXERCISES

1. Draw an outline map of Australia. On it mark (a) by a broken line, the boundary of the region receiving less than 10 inches annual rainfall; (b) the January isotherm 75° F.; (c) print CATTLE, SHEEP, WHEAT each over *one* important area of production.

2. (a) In what part of Australia are (i) most sheep reared, (ii) a moderate number, (iii) only a small number? (b) Which of the areas you have named carry most sheep per acre? (c) In which area will the farms be largest? Why? (d) Why are no sheep bred in the north of Australia, except in a few of the highland areas?

3. Under the following headings write short notes on wheat production in Australia: Climate; Chief areas of production; Months when crop is (i) sown, (ii) harvested; Two ports of export; Approximate time of arrival of crop in England; One other wheat-growing country whose crops arrive in England about the same time.

4. Name *five* minerals mined in Australia. In the case of the *two* most important, name one important area of production for each with *one* port of export.

CHAPTER VI

REGIONS OF AUSTRALIA

States and Regions

As Australia became settled it was divided into a number of colonies, later called states. The Commonwealth of Australia consists of the states of New South Wales, Victoria, Queensland, Western Australia, South Australia, and Tasmania, together with the Northern Territory and the small Federal Capital Territory around Canberra, the Federal Capital. South-West New Guinea (Papua), together with some neighbouring islands, is also administered by the Commonwealth Government.

We have already seen something of the life and work of the people living in the different regions of Australia, and a glance at the map (Fig. 21) shows us that these regions have little relation to the states, whose frontiers are, for the most part, straight lines. We may conveniently divide Australia into the following regions, the chief of which fall into well-marked natural divisions: South-Eastern Australia, Queensland, Northern Australia, Western Australia, and Tasmania.

South-Eastern Australia

South-Eastern Australia comprises New South Wales, Victoria, and the south-east of South Australia. The Eastern Highlands separate the coastal lowlands from the Murray-Darling Basin. Out of every 100 persons in Australia about 75 live in the South-East, and of these the most have their homes in the temperate coast-lands stretching from Newcastle to Adelaide.

The well-watered *East Coast Lowlands* of New South Wales, from 100 to 200 miles wide, are noted for dairying. Most of the milk is made into butter both for home con-

sumption and export, while the skim milk is used to feed pigs reared for bacon. Nearly every farmer keeps poultry: on an average, Australia sends some eleven million eggs to Britain each year. The damp climate of the coast-lands is better suited to dairying than to wheat production, and though sheep are grazed on the uplands few are found on the lowlands. Maize and sugar-cane are cultivated in the warmer north, apples and other temperate fruits in the cooler south.

Sydney ($1\frac{1}{2}$ millions), the capital of New South Wales, stands on the magnificent harbour of Port Jackson (Plate 5), which is spanned by an enormous arched bridge that connects the main city with North Sydney on the opposite shore. Owing to the hilly nature of the site the streets of Sydney are winding and no wider than those in the usual English town. Charm is added to the city by the beautiful parks and fine public buildings constructed of local sandstone. As there is ample space to build, the majority of the people of Sydney—as in most Australian towns—live in bungalows, each in its own garden. There are, of course, blocks of flats in the more densely peopled districts, and the older houses are often two- or three-storied structures, but these types of private dwellings are the exception rather than the rule.

Sydney is the outlet for the most productive part of Australia. The coastal region provides coal, butter, and wool, but its hinterland extends across the Eastern Highlands into the Murray Basin which yields wool, meat, fruit, and minerals for export. Its industries include milling flour and manufacturing wool. Nearly the whole of Australia's trade with the Pacific is centred on Sydney, which has important connexions with the United States, Japan, and other countries having a frontage on that ocean.

Newcastle, on the Hunter river, is the northern outlet for the New South Wales Coal-field. Iron-ore is shipped from Whayalla and limestone from Devonport, Tasmania, to feed

its blast furnaces, which like its iron, steel, and engineering works and shipyards use local coal.

Melbourne stands at the head of Port Phillip Bay, which cuts right into the heart of the *Great Victoria Valley* bounded on the north by the Eastern Highlands and on the south by the Otway Range and the Gippsland Hills. In this fertile east to west valley, dairying and sheep-farming are important, and fruit, wheat, maize, beans, and sugar-beet are grown. The brown coal (lignite) mined in Gippsland is used to generate electricity, which is transmitted to all parts of Victoria and adjacent areas in New South Wales.

Steamers of moderate draught can ascend the Jarra estuary to *Melbourne*, but larger vessels anchor off Port Melbourne, or Geelong, a flour-milling and woollen manufacturing town on the west side of Port Phillip Bay. With a population of a million, Melbourne, the capital of Victoria, is the second largest city in Australia. It commands routes east and west through the Great Victoria Valley, and north through the Kilmore Gap to the Murray Basin. Consequently its hinterland overlaps and rivals that of Sydney in importance and, except for coal, its exports are similar.

The railway from Melbourne to Sydney crosses the Murray at Albury and on a branch of this line stands *Canberra*, the Federal Capital. When Australia, in 1901, became a Commonwealth it was difficult to decide which of the big cities should become the capital of the whole country, and so it was arranged that a new capital should be built as the seat of the Central Government. The site was selected in 1909 and the new city stands on a plateau, 2,000 feet above sea-level, on a tributary of the Murrumbidgee.

The *Murray-Darling Basin* occupies about one-fifth of Australia. The Murray enters the Southern Ocean (where the waters of the Pacific, Indian, and Antarctic Oceans meet) through Lake Alexandrina. Unfortunately, the mouth of this shallow lagoon is blocked by a sand bar and so ocean steamers cannot enter the river. The Murray, Darling, and

the Murrumbidgee are, however, navigable at certain seasons for river steamers. From July to January, inclusive, vessels can ascend the Murray for 1,400 miles to Albury, and the Darling 1,000 miles above Wentworth. Morgan, on the lower Murray, Wentworth, and Bourke, a stock-rearing

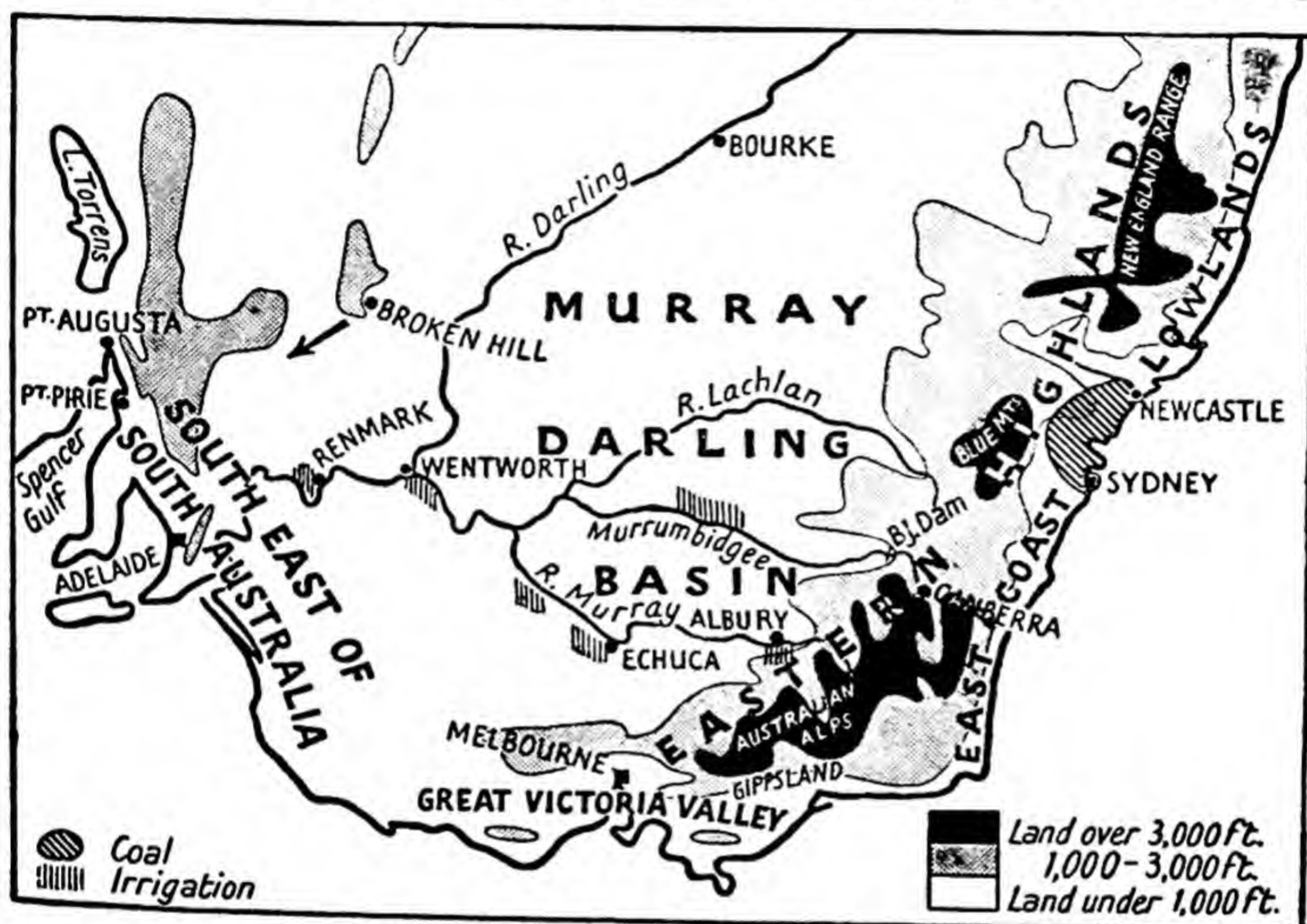


FIG. 16. South-Eastern Australia

centre on the Darling, collect river-borne produce, such as wool and grain, and forward it by rail to the nearest seaport. They also ship stores up-stream for towns and settlements along the banks of the rivers.

But the streams are more important for irrigation than navigation, as the alluvial plains of the Murray only need water to make them yield rich crops. Dams, such as the Burrinjuck Dam, on the upper Murrumbidgee (N.S.W.), and reservoirs, weirs, and locks have been built to hold back a head of water and so increase the supplies available for irrigation. Since it is expensive to build and maintain irrigation works, the cost of land is rather high and careful

and close cultivation is necessary to make agriculture remunerative. Large areas are devoted to fruit growing, for which the dry sunny climate is admirable. There are many orchards on irrigated lands, as round Renmark (South Australia), Mildura (Victoria), and in certain parts of the Riverina, the area lying between the Murray and the Murrumbidgee.

Outside the irrigated areas sheep farming and wheat growing are the chief agricultural occupations. The main wheat belt lies close to the Eastern Highlands where the rainfall is greatest. In the upper valleys, opening to the Basin, mixed and dairy farming are becoming important, as they are also in the swampy lands of the lower Murray which are now being drained. Towards the interior the wheat belt merges into the drier pastoral zone where large numbers of sheep are raised.

The South-East of South Australia is the only really productive region in a state more than four times the size of Great Britain, but whose total population is little more than half a million.

Wheat is cultivated in the south of the Rift Valley, which opens to Spencer Gulf and the Gulf of St. Vincent, but the drier northern part of the valley is pastoral. More than half the population of South Australia live in *Adelaide*, the capital, some 6 miles inland from the Gulf of St. Vincent. This well-planned city, with its spacious streets, stands on the plains at the foot of the Mount Lofty Range across which railways have been built to the Murray Basin. It is favourably placed for collecting the fruit, wheat, and dairy produce of the lower Murray, the wheat and wool of the Rift Valley, and the wine and grapes of vineyards on the surrounding hills. Much of this produce is dispatched through *Port Adelaide*, on the Gulf of St. Vincent. At *Port Pirie*, on the east side of Spencer Gulf, which is the outlet for the famous Broken Hill mines, silver and lead are smelted and refined. *Whyalla*, on the opposite side of the

Gulf, exports iron-ore from Iron Knob, 40 miles inland. At the head of the Gulf stands *Port Augusta*, the present terminus of the Trans-Continental Railway from Perth, and the future terminus of the south to north line across Australia, now under construction.

Queensland

Though Queensland is the second largest state in the Commonwealth it has a population somewhat under a million. The Coastal Belt is separated by the relatively low but broad Eastern Highlands from the Interior Plains of the Great Artesian Basin.

Coastal Queensland, hot and wet throughout the year, especially north of the Tropic of Capricorn, is well suited for tropical and semi-tropical agriculture. Bananas, cotton, pineapples, and sugar-cane are grown on the lowlands and maize at higher elevations. Of all these crops sugar-cane is the most important, and sufficient is grown to supply the needs of Australia and to provide a surplus for export. There are plantations in a number of the valleys, but all lie within 30 miles of the seaboard. The chief centres are at Grafton (N.S.W.), Maryborough, Mackay, and Cairns. Unlike the sugar plantations of Natal, those of Queensland are worked entirely by white labour, and in the hotter north there are numbers of settlers of Italian descent, who are better able to withstand the heat than people of North European stock. The white labourers, exclusively employed on the Queensland sugar plantations, who perform such tasks as cutting and carting the canes under a blazing tropical sun, and toiling in the steamy atmosphere of the filter presses, command high wages for their arduous work. Thus the cost of production is high and the industry is protected by tariffs and wages boards. But it is now proved that whites can perform heavy manual labour under tropical conditions, justifying Australia's claim that it is possible to colonize her tropical areas with people of European stock.

On the cooler and wetter windward slopes of the uplands there are many dairy farms, while in the Highlands themselves there are valuable minerals.



FIG. 17. Queensland

Most of the people live in the coastal belt and the adjacent uplands, where the chief towns, most of them ports of moderate size, are situated. From these the first railways were built inland to the pastoral, mining, and agricultural areas, but now lines also run along the coast from *Brisbane* as far north as Cairns. Brisbane, the capital of Queensland,

placed on hills some 12 miles up the estuary of the Brisbane River, is a city of 300,000 inhabitants. It is linked by rail with the coal-mining centre of Ipswich, higher up the valley, and is the outlet for the sheep-grazing area of the Darling Downs and, of course, for the sugar and banana plantations along the coast. *Gympie*, farther north, is a gold-mining centre. *Rockhampton*, on the Tropic of Capricorn, is the chief port and commercial town of Central Queensland. To its meat canneries and docks come cattle from the Great Artesian Basin and the rich grass-lands of the Fitzroy Valley; gold from the Mount Morgan mine and coal from the Dawson Valley which opens from that of the Fitzroy. *Mackay* refines sugar. *Townsville* is linked by rail with the pastoral centre of Hughenden, in the interior, the copper-mining district of Cloncurry, the gold mines of Charters Towers, and the silver-lead-zinc mining centre of Mount Isa, 600 miles distant. *Cairns*, the centre of an important sugar-producing region, is also the outlet for the tin and copper mines of Chillagoe.

The Interior Plains of the Great Artesian Basin lie between the Eastern Highlands and the Western Plateau. Northward this pastoral area stretches to the Gulf of Carpentaria; and south-west through New South Wales to Lake Eyre. The grazing grows richer towards the Eastern Highlands where the rainfall is greater and streams descend to the plain, but westward it becomes progressively poorer as it merges into the scrublands encircling the desert. From a ridge the surface appears to the observer as a smooth sea of yellowish-green vegetation, but at closer range the grass is seen to grow in tufts, a few inches or even feet apart. To the casual onlooker these undulating plains scarcely give a clue to their main industry, for owing to the scanty rainfall the pasture is insufficient to support more than a few cattle per acre. To the keen eye, however, the wire fences, the artesian bores with their radiating channels, the broad stock routes leading to the few railways, and the

figure of a stockman etched against the sky-line, tell of cattle and sheep dispersed throughout the Basin. The animals are rarely seen, except around pools in the partly dried up streams (Plate 6), for they roam over scanty pastures enclosed with hundreds of miles of rabbit-proof fencing. Almost half the 13 million cattle, and a fifth of the 114 million sheep in Australia are bred in Queensland, and of these the majority are grazed on the breezy undulating plains of the Great Artesian Basin.

The Great Barrier Reef

Ships calling at Queensland ports, or outward bound for Asia, pass along the channel lying between the Great Barrier Reef and the mainland. The Reef extends for 1,200 miles from the Tropic of Capricorn almost to New Guinea. In the south this great belt of coral is somewhat more than 100 miles from the coast, but northward, near Cape Melville, it approaches within 7 miles, after which it swings out again. This natural breakwater consists of a number of reefs, many submerged at high water, which are separated by difficult channels leading to the open Pacific.

The main channel—'Australia's Grand Canal'—is studded with islands: some of coral formation, some peaks of a submerged coast-line. And the blue waters are mottled with those patches of yellow and green which show that coral reefs lie close to the surface. Though the channel is used by shipping in preference to the open waters of the Pacific, navigation is difficult and, in spite of the lighthouses and buoys which mark the passage, the slightest miscalculation may mean disaster. But even more difficult to negotiate are the treacherous but fascinating waters of the Torres Strait. Trim two-masted pearling luggers are based on Thursday Island, which commands the Strait. They are owned by Japanese, but manned by Papuans, aborigines, and Torres Strait islanders who dive in deep waters for the pearl-oysters. Smaller one-masted cutters fish in shallow

waters for trochus (sea-snails) and bêche-de-mer. The shells of the former are sent to Japan for making shirt buttons: the latter, a species of sea-slug, are dried and exported to China where they are used for making soup.

The Northern Territory

Travellers from England by air make their first acquaintance with Australia at *Darwin*, the administrative centre and the only port in the Northern Territory. In the whole of this vast region, whose area is five times that of the British Isles, there are approximately 3,000 white people, 1,500 of Asiatic descent, and 18,000 aborigines. Even if we did not know that the aborigines are mainly hunters, it would be obvious that most of the Northern Territory is little developed. Apart from the forested lowlands fringing the seaboard, this region consists of the eastern part of the Western Plateau where the climate, though somewhat trying to white people, is not unhealthy. The forests of the north are gradually replaced by more open savannas which grow poorer and poorer towards the arid interior. Cattle rearing is the main occupation; the principal ranching areas lie round the Roper and Victoria rivers, on the Barkly Tableland, along the Queensland frontier; and around the MacDonnell Range in the interior. In the last area the main centre is Alice Springs, the present northern railhead of the projected north to south Trans-Continental Railway, whence cattle are dispatched to Port Augusta. In the north the railway has been pushed from Darwin as far as Birdum. Its completion, and the sinking of artesian wells, will help to develop the Northern Territory, though at the best it will only be able to support a scanty population.

Western Australia

England would be a strange country if practically the whole population lived in the Devon-Cornwall Peninsula. Yet of the 450,000 inhabitants of Western Australia nearly

all are found in the south-west corner of this huge state which covers almost a third of the continent. The reason for this distribution is not hard to find. It is due to the climate, and especially the rainfall. The south-west is the only part of Western Australia with a temperate climate and

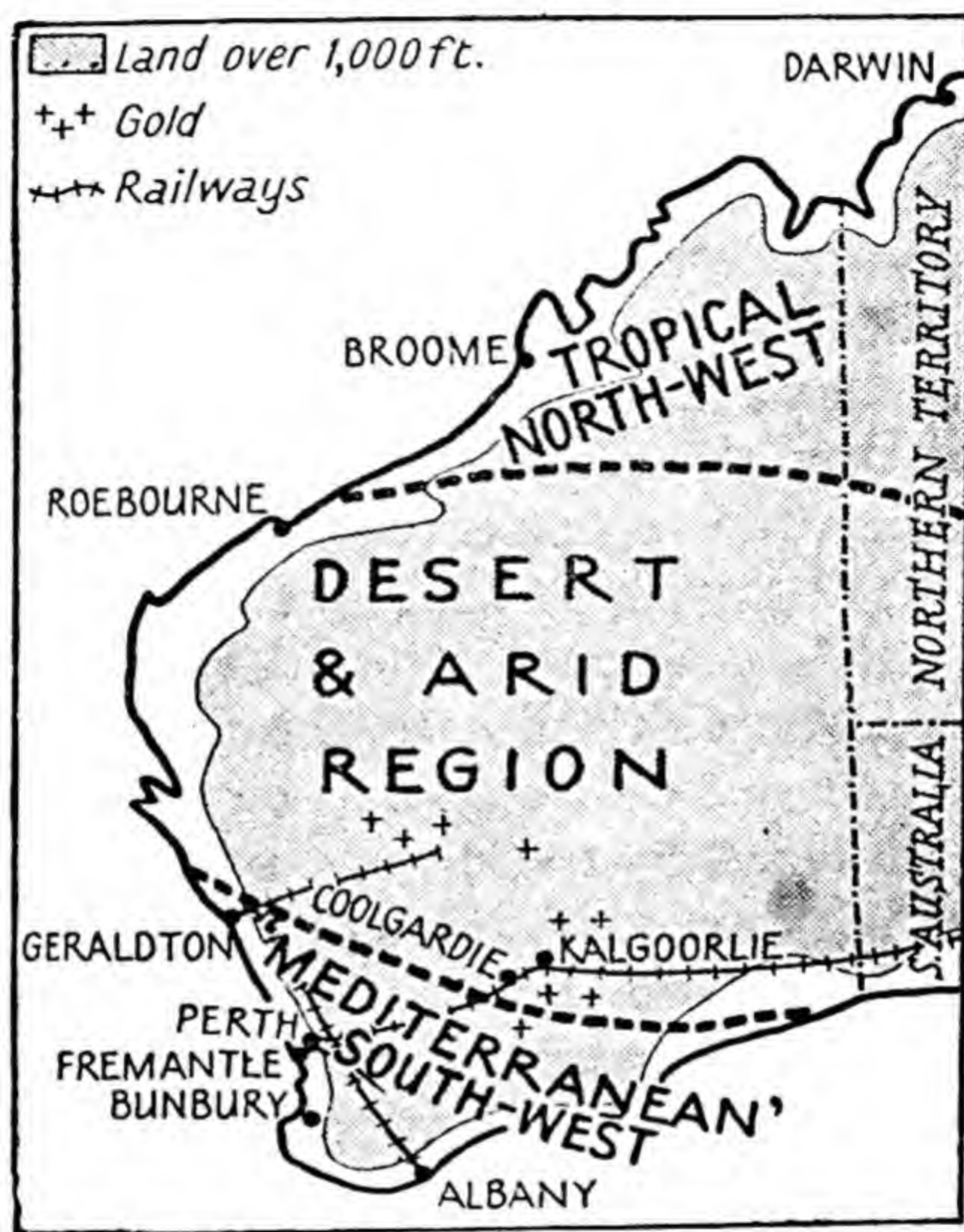


FIG. 18. Western Australia

a really reliable rainfall. The tropical north-west has, it is true, summer rains, but owing to the heat it is not well suited to white settlement except in the higher regions. Most of the interior is an arid and desert region which, having a rainfall of less than 10 inches, cannot be used either for growing wheat or grazing sheep.

The Tropical North-West resembles the adjacent area in the Northern Territory. The savanna forests of the coastal belt merge into poorer grasslands towards the south and east. Cattle ranching is the main occupation, the chief

area being the Kimberley Plateau for which the port of Wyndham is the outlet. Broome and Roeburne are centres for pearl fisheries.

The Arid Region extends from the interior southward to the Great Australian Bight and westward to the sea between Roebourne and Geraldton. Over most of this area the rainfall is under 10 inches. In areas where the rainfall exceeds 10 inches, such as the coastal districts or the higher plateaux, there is grazing. But the wealth of this region lies in its goldbearing reefs. In the north is Pilbara gold-field. The mining camps on the Murchison field are served by the railway running to Geraldton; centres farther south, such as Coolgardie and Kalgoorlie by the Trans-Continental Railway or its branch lines. The iron pipe-line, about 8 feet in diameter, which runs beside the railway, is a symbol of the dryness of this region; through it water is pumped for 350 miles to the mining districts from a reservoir east of Perth.

The South-West with its Mediterranean Climate is the most productive part of Western Australia. The distribution of natural vegetation, crops, and animals depends almost entirely on rainfall. The extreme south-west, with an annual rainfall exceeding 30 inches, is well forested. Its exports of timber, especially of jarrah and karri, exceed those of any other Australian state. But extensive areas have been cleared for dairy farming and fruit growing. The district to the south-west of Bunbury is noted for its apple orchards, orange plantations and vineyards. Both *Bunbury* and *Albany* on the south coast, the latter being the terminus of a railway from Perth, export fruit and timber as well as coal mined at *Collie*. The zone to the north-east of the timber belt, where the annual rainfall ranges from 20 to 30 inches, is a mixed farming area where wheat is the main crop. In the succeeding drier belt sheep are grazed on pastures that grow more and more scanty towards the invisible line marking the limit of the 10-inch rainfall,

beyond which both pastoral and agricultural occupations are impossible except where water can be obtained from artesian wells.

Almost half the population of Western Australia live in *Perth*, the capital, some 10 miles up the Swan River. At *Fremantle*, at the mouth of this river, steamers from England via the Suez Canal land mails and passengers intending to travel east by the Trans-Continental Railway.

FOREIGN TRADE OF AUSTRALIA			
EXPORTS		IMPORTS	
Wool		Textiles	
Wheat & Flour		Petroleum	
Gold		Chemicals	
Butter		Bags & Sacks	
Meat		Elec. Machinery	
		Iron & Steel Goods	

FIG. 19.

Tasmania: Australia's Island-State

It is a day's journey across Bass Strait from Melbourne to *Launceston*, situated at the head of the Tamar estuary. This mountainous island of Tasmania is more than three times the size of Wales, but its population is little more than a tenth that of the Principality. The rugged Western Highlands, drenched with rain from the Brave West Winds, are densely forested, mainly with beech and pine. In the less rugged and drier east eucalypts abound, and pastures clothe the lower slopes of the valleys and hills. The many rivers, fed by abundant rain and melting snows, provide ample power for the generation of electricity and also furnish channels for transporting logs to the saw-mills. The waters of some of the highland lakes are led by canal and pipe-lines to the valleys, where the fall is used for hydro-electric power (Plate 4). Oats and potatoes are grown. On the coast-lands of the north cattle are reared both for meat and milk, but sheep are grazed in the drier east and in the more sheltered Tamar Valley, where woollen goods are manu-



5. SYDNEY AND AUCKLAND

(Above) Sydney's magnificent branching harbour of Port Jackson, showing the Parramatta River running up the centre, and the Lane Cove River entering on the right. In the foreground is the great bridge, opened in 1932, which connects the main city with North Sydney (see p. 43). (Below) Auckland, the largest city in New Zealand, showing Northshore and the splendid harbour on the east side of the city (see p. 64)



6. A QUEENSLAND CATTLE STATION AND A TASMANIAN FRUIT FARM

(Above) Watering cattle on a Queensland Station. The animals are widely dispersed and are seldom seen in large numbers except when they are being watered, or rounded up ready to be driven along one of the stock roads to the nearest railway (see p. 50). (Below) A fruit orchard in the Tamar Valley, Tasmania, whose mild and rainy climate makes it the chief apple-producing state in Australia (see p. 55)

factured at Launceston. Tasmania is famous for its apples which provide half the Commonwealth's export of this fruit. Many of the orchards (Plate 6) lie round *Hobart*, the capital, which, standing at a point where several streams enter the sea, is well placed for collecting fruit and timber from the surrounding area. Thus its industries

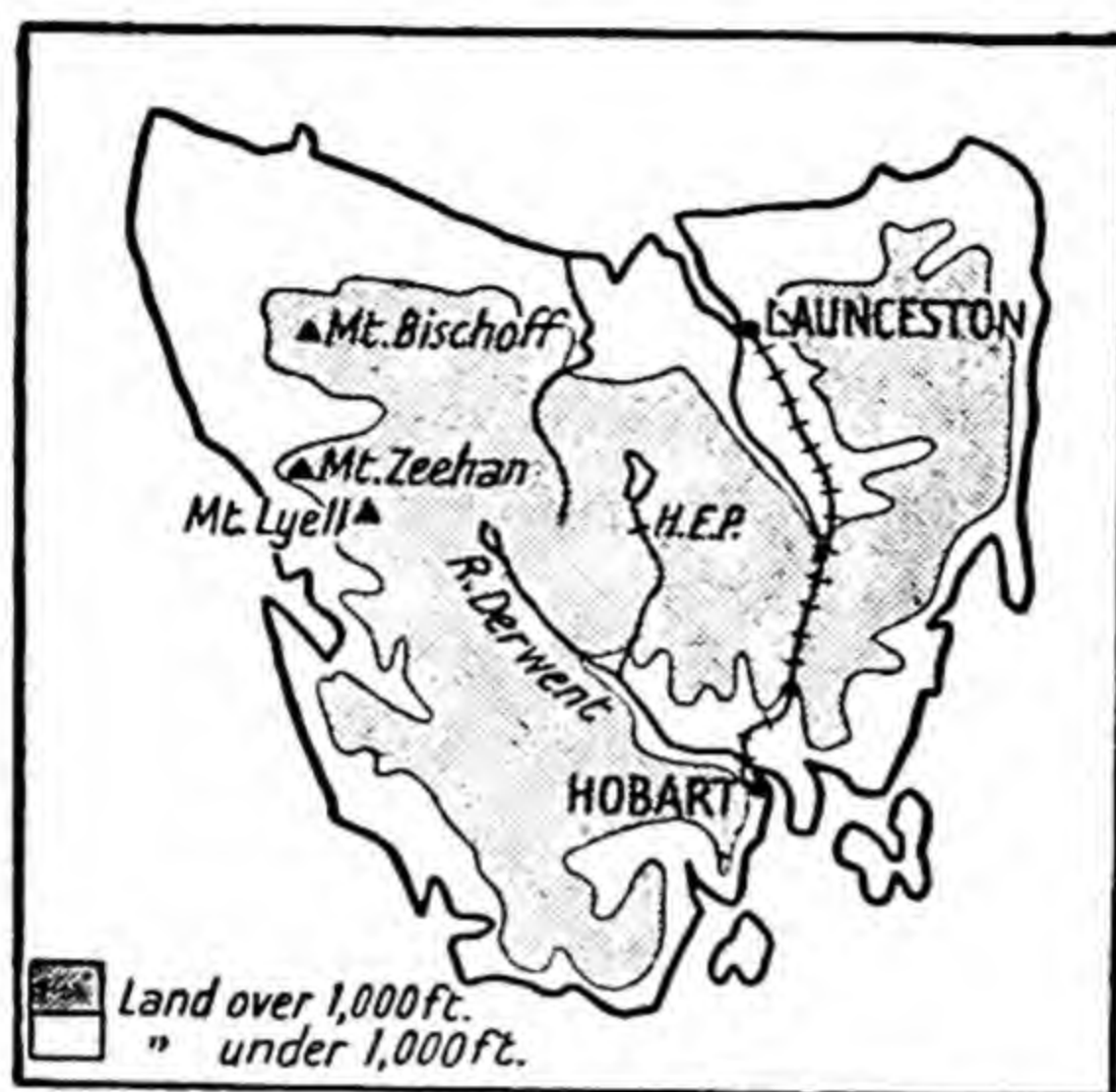


FIG. 20. Tasmania

include canning and preserving of fruit, as well as jam making, and it has become the leading port in Tasmania for overseas trade.

The Western Highlands yield tin and such rich supplies of copper that Mount Lyell (as well as producing gold) has become the chief copper-mining centre in the Commonwealth. *Risdon*, near Hobart, uses cheap hydro-electric power for smelting and refining zinc obtained from Broken Hill (New South Wales).

The Distribution of Population

We have seen that the most productive regions in Australia are those areas which have an adequate and reliable rainfall. Apart from minerals, the chief exports of the Commonwealth are wool, wheat, butter, and meat, all of

which come from regions where the annual rainfall is not less than 10 inches. The interior, except in the mining areas and the Great Artesian Basin, is little developed. Naturally, most people are found in the productive areas.

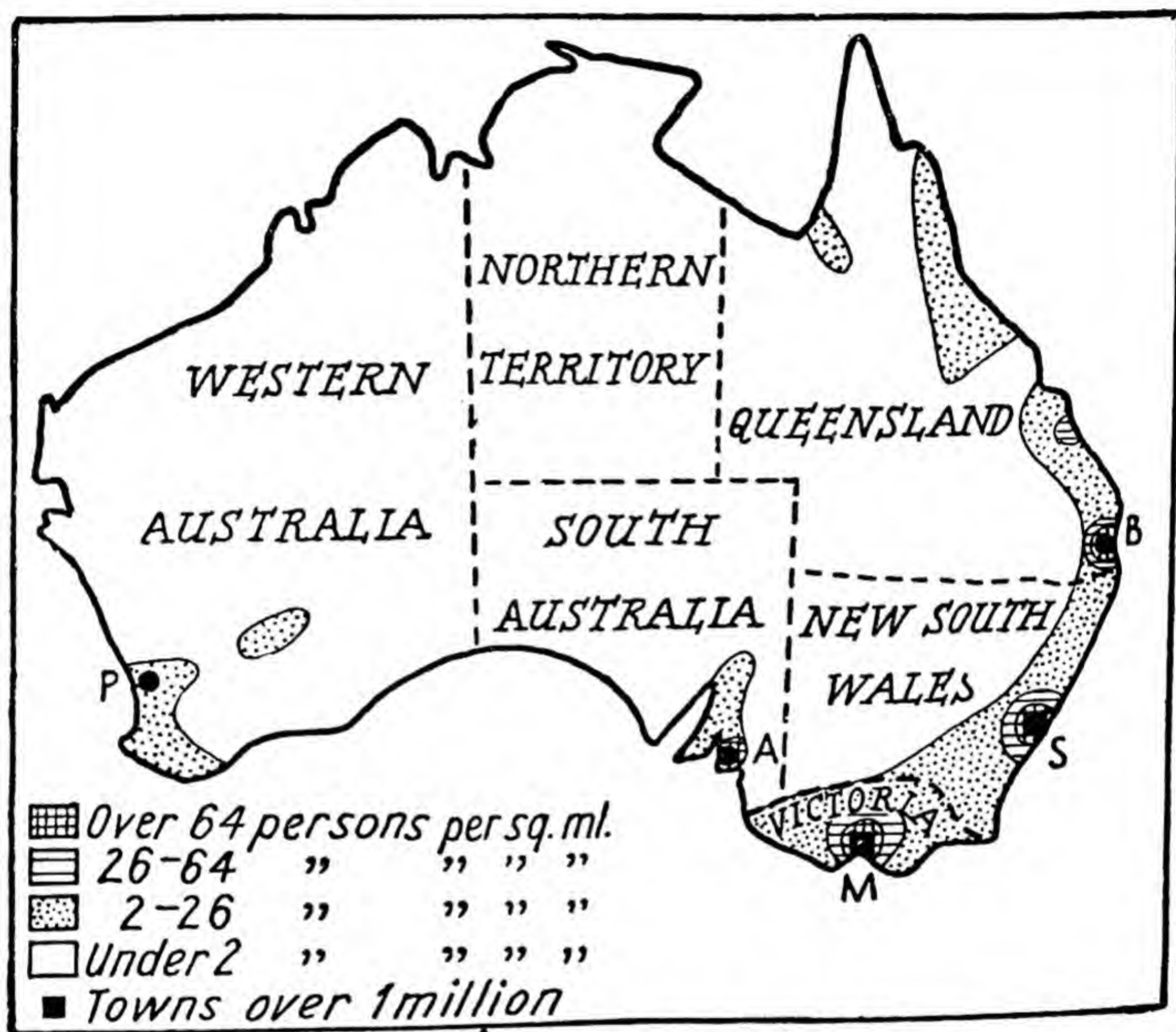


FIG. 21. Australia: Distribution of Population

Out of the total population of 6,700,000 four-fifths live in the well-watered regions along the temperate coastal belt of the east and south-east, and in the south-west corner of Western Australia. The dry interior, comprising over one-third of the country, is sparsely peopled, as also is the tropical north. The people of Australia wish to preserve their continent for the white races. So far they have succeeded in doing this, for practically the whole population is of British descent.

Out of every 100 people in Australia only 32 live in the country districts and 25 reside in the small towns. The remaining 43 (approximately two-fifths) live in the five state capitals of Sydney, Melbourne, Brisbane, Adelaide, and Perth, which have a combined population of just over 3,000,000. This is a remarkable fact. All these capital cities are ports, and as the wealth of Australia lies in her export trade, it is in these busy centres that the bulk of the people find employment.

Transport

As in South Africa, so in Australia the distribution of minerals, especially gold, had a great effect on the development of railways. Many of the earlier lines were built from the ports to the inland mining centres, but as well as carrying minerals they played a great part in opening up the country.

Unfortunately, when railway construction was first undertaken no standard gauge was decided on for the whole of Australia, with the result that there are at the present time four different gauges. Thus a railway journey from Perth to Brisbane, 3,500 miles, takes 170 hours (or twice as long as to cover a similar distance from New York to San Francisco) on account of five changes of gauge and eight changes of train.

In a country so isolated, and with such great internal distances as Australia, air transport is destined to become increasingly important both for overseas and inland communication. Great advances have been made in recent years and the relief of the country, coupled with the climate, favours flying operations. There is a mail and passenger service between Australia and England by way of Brisbane, Charleville, Daly Waters, Darwin, and Singapore. From Hobart, Sydney, Melbourne, and Adelaide connexion is made with this trunk service at Charleville; and from Perth at Daly Waters. The Federal Capital of

Canberra as well as all the state capitals, including Hobart, are linked by air. There are also regular services between Australia and Papua (South-East New Guinea), as well as with New Zealand.

EXERCISES

1. (a) Draw a sketch-map of the Murray Basin. Shade the high land and mark and name (i) the main stream and *four* only of its tributaries, (ii) six towns. Show thus \equiv the chief irrigated areas. (b) Describe the importance of the rivers in the basin as regards (i) Navigation, and (ii) Irrigation. (c) Name *three* important products (excluding minerals) obtained from this region. Describe briefly the route by which *one* of these products is conveyed to the port of export.
2. What do you mean by an artesian well? Explain the importance of such wells in Australia, paying special attention to the Great Artesian Basin.
3. How do you account for the presence of the following industries in the towns named: (a) woollen manufactures at Sydney; (b) jam-making at Hobart; (c) sugar-refining at Mackay; (d) engineering at Newcastle; (e) meat canning at Rockhampton; (f) silver and lead refineries at Port Pirie; and (g) flour milling at Melbourne?
4. Give an account of a journey by air from Melbourne to Darwin, describing the type of country over which you would pass and naming two airports *en route*.
5. On a sketch-map of Australia (a) draw a line to enclose the area with less than 10 inches annual rainfall. (b) Shade the most thickly peopled areas and print SPARSE over the most sparsely peopled regions. (c) What proportion of the population live in the five great ports? How do you account for this fact?
6. Fig. 19 shows the chief exports of Australia. What can we learn from them about (a) the natural vegetation, and (b) the occupations of the people of the Commonwealth?

CHAPTER VII

NEW ZEALAND: THE BRITAIN OF THE SOUTH

**Majestic Mountains, Beautiful Fiords, and
Active Volcanoes**

THE Dominion of New Zealand lies in the South Pacific Ocean, 1,200 miles, or a three days' voyage, from Australia. Of all the overseas states in the British Commonwealth of Nations, it probably most resembles in character the Mother Country. Apart from 80,000 native Maoris, nearly all the 1,500,000 people are of British descent who, even if they have never visited it, regard Great Britain as their Homeland. The Dominion is often spoken of as the Antipodes of the British Isles, but it does not lie in an exactly similar position on the opposite side of the globe; for as it stretches from 34° S. to 47° S., or approximately 900 miles, its situation corresponds more closely to that of the Mediterranean countries of Europe. Owing, however, to its position in the temperate zone, the climate of New Zealand resembles that of the British Isles rather than the Mediterranean Lands.

New Zealand, which consists of the North and South Islands and the smaller Stewart Island, has a total area somewhat less than that of the British Isles. In both the North and the South Islands fold mountains run from north-east to south-west following the general trend of the country. The Southern Alps, which run through the South Island, rise steeply from the west coast, but on the east they are bordered by the Canterbury and other plains. The snow-clad summits of many peaks rise to over 10,000 feet, while Mount Cook, whose native name, Aorangi, means 'the Cloud Piercer', towers in frozen splendour to a height of 12,349 feet. Above the snow-line, which in the south

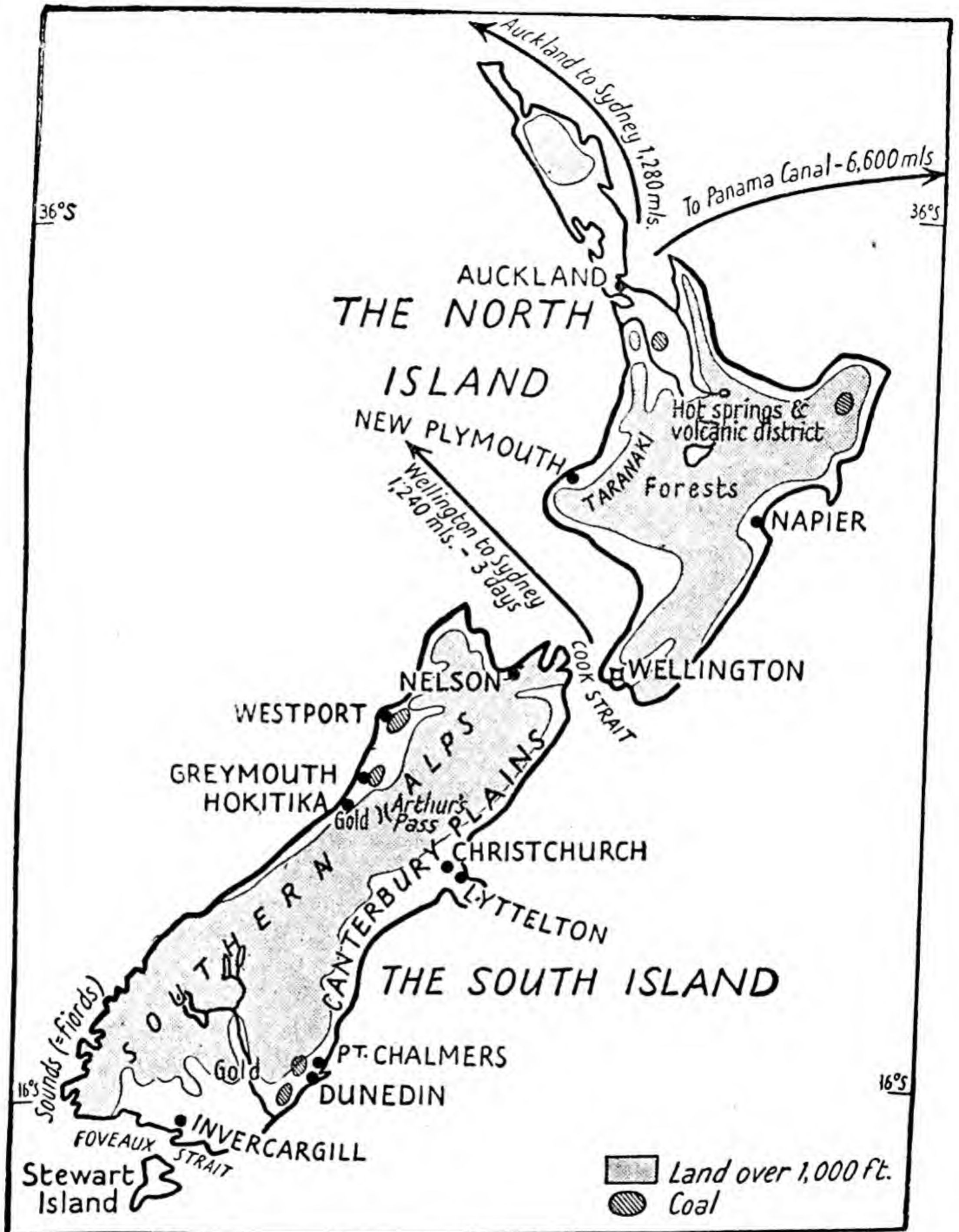


FIG. 22. New Zealand: General and Economic

reaches to within 700 feet of sea-level, glittering glaciers fill many of the valleys: the Tasman glacier, greatest of all, is 18 miles long and has an average width of $1\frac{1}{2}$ miles. Waterfalls descend in crashing volume from the snow-fields, here whirling in white foam over massive boulders, and there decking the precipices with sheets of feathery spray. In the south-west corner of the South Island the mountain wall is pierced by deep, steep-sided fiords called *sounds*, which resemble those of South-West Chile. The most famous is Milford Sound, whose mighty cliffs in some places rise for a mile sheer above the clear deep waters beneath. The sides of other sounds, less steep, are clad with trees, shrubs, and beautiful tree-ferns, which climb from the water's edge to the very top of the cliffs, mantling the rocky walls with a covering of verdant green. In this region, too, are long narrow mountain lakes, like Lake Wanaka, whose waters are carried by turbulent streams to the south-east coast.

The mountains of the North Island are lower and more broken than those of the South Island. From the main ranges, which lie close to the south-east coast, downland country extends westward to the Taranaki Plains, and southward to the Wellington Plains. The disturbances, which resulted in the formation of these fold mountains, were accompanied—as in the case of the far greater Andes—by volcanic activity. In the centre of the North Island is a wonderful volcanic plateau, stretching from Lake Taupo northward to the coast. Rising from the plateau are isolated volcanic peaks some of which, like Ngauruhoe (7,515 feet), are still active, geysers, and hot springs. In the south-west of the island the extinct volcano of Mount Egmont (8,260 feet) (Plate 7) dominates the surrounding district: in winter, when even its lower slopes are sheeted with snow, it forms a striking landmark both from land and sea.

An Insular Climate

New Zealand has an insular climate and suffers from no extremes of heat or cold. Lying nearer the equator it is warmer than the British Isles; but as it is not situated close to a great land mass, the influence of the ocean is somewhat greater than it is in the latter region, and both in winter and summer temperatures decrease from north to south. Taken

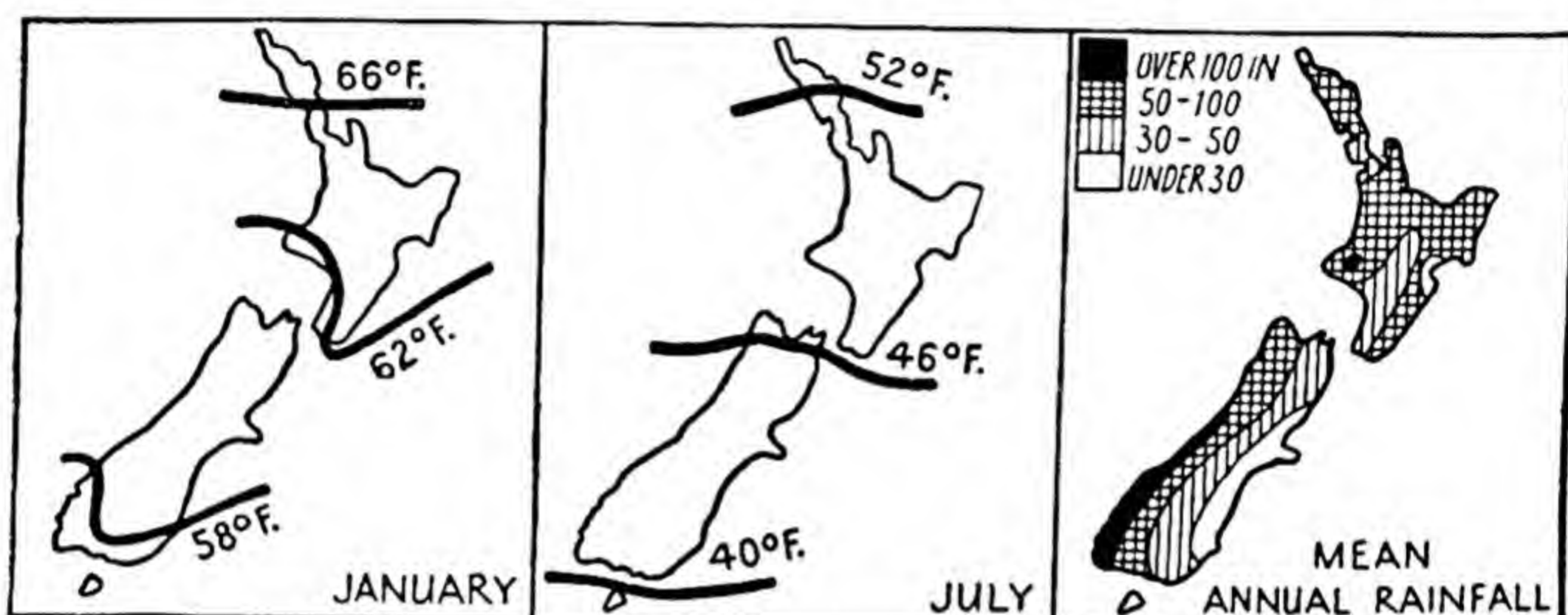


FIG. 23. New Zealand: Temperature in Summer (January) and Winter (July); and Mean Annual Rainfall

as a whole, New Zealand is sunnier than Britain and in most areas there is, on an average, bright sunshine for six hours a day all the year round.

The prevailing Brave West Winds, sweeping over thousands of miles of ocean, cause heavy rain to fall in the west, especially on the windward slopes of the Southern Alps, which receive over 100 inches a year (Hokitika, 117 inches). But the Canterbury and other Plains lying in the rain shadow of the Southern Alps are considerably drier and their annual rainfall ranges from 30 to 40 inches. The climate of these plains, though milder in winter and somewhat wetter, is not unlike that of South-East England.

In the North Island, owing to the fact that the mountains are lower and less continuous, the rainfall is more evenly distributed. The east is, of course, drier than the west, where the district round Mount Egmont has a very heavy

rainfall. In summer, when the wind belts move south, the northern part of the Island lies in the track of the South-East Trades which bring rain to the east coast.

New Zealand, it will be seen, as a whole has an adequate and well-distributed rainfall. Unlike Australia, no part of the country suffers from drought, and there is ample rain for agriculture.

Natural Vegetation and Wild Animals

One fact that impresses the visitor to New Zealand is that all the native trees are evergreen. In drier regions, like the Eastern Plains of South Island, the vegetation consists mainly of grasses and sedges forming tussocks, but the wetter areas are wooded, and though large stretches have been cleared, a fifth of the country is still clad with bush (forest), but probably only about one-tenth is covered with good timber. Owing to the heavy rainfall the lower slopes of the Southern Alps are clothed with evergreen rain-forests. The trees grow almost as closely together as in the hot wet equatorial forests, but the atmosphere, instead of being oppressive, is as fresh as that of an English woodland. The trunks of pines, giant tree-ferns, and beeches are draped with lichens, mosses, climbing plants with long, woody, rope-like stems and clinging vines; and the branches are often so interlocked that it is difficult to tell which foliage belongs to this tree and which to that. The Auckland Peninsula of the North Island is the home of the stately kauri pines, some of which reach to a height of 150 feet.

A useful native plant is the New Zealand flax which, like the sisal grown in East Africa, yields a tough fibre much used for making binder twine.

When the first white settlers came to New Zealand they found that the only native animals were the dogs, probably brought by the Maoris, rats, and bats. They found, too, that in the course of ages the indigenous birds, like the great moa, now extinct, and the kiwi, had lost the use of their

wings as they had no foes from which to fly. Immigrants such as starlings, sparrows, and rabbits are now so common that they prove pests to farmers. Deer are numerous; trout have been found to thrive in the rivers, while Alaskan salmon have been successfully introduced into the cool mountain streams of the south-east of the South Island.

The North Island

The slender Auckland Peninsula, joined to the broad southern portion of the North Island by a narrow isthmus, is indented by numerous bays. If we were to sail up one of these bays and take soundings we should find that they gradually grew shallower towards their heads, for they were formed by the sinking of the coast-line which thus allowed the sea to invade the lower portions of the valleys. Inlets formed in this way are called *rias*.

The kauri pines furnish some of the best hard timber in the world, as well as providing gums which are used in the manufacture of high-grade varnish and linoleum. But, unfortunately, great stretches of the kauri forests which formerly covered the Auckland Peninsula have been cut down and the once important gum industry, which included the digging of the fossilized gum of bygone trees, has almost died out. On the lush meadows of the valley of the lower Thames, which drains into Hauraki Gulf, and on those in the Waikato many cattle are grazed both for dairy purposes and meat, while sheep are bred on the hills. The warm climate of this northern part of New Zealand also favours the cultivation of vines and warm temperate fruits.

Auckland has a harbour on both sides of the island, but as that on the west coast is shallow, the deeper eastern one is used by ocean vessels sailing via the Panama Canal to ports on the east coast of North America, Europe, and the British Isles, and to Sydney, 1,280 miles distant (Plate 5). Its favourable position, and its situation in the midst of a dairy, fruit-growing, and timber district has contri-

buted much to its importance, and, with a population of 212,000, it is the largest town in New Zealand.

The Volcanic District stretching from Lake Taupo to the Bay of Plenty, a veritable wonderland of cones, geysers, shallow lakes, and hot springs, is visited by many tourists. Some of the geysers eject columns of water; others throw up masses of boiling mud. The brilliant colouring of the lakes, the bright cliffs of volcanic rock, and the clouds of white steam rising amidst masses of dark green vegetation, make a picture so vivid that it lives for ever in the traveller's memory. The hot springs contain salts useful in curing certain ailments, and at *Rotorua* there are bath establishments which are visited by invalids. Many of the Maoris live in this region.

The area round *Hawke Bay*, on the drier leeward side of the highlands, is noted for sheep. *Napier* is the chief port; *Hastings*, an inland town to the south, is a pastoral centre.

On the other hand, the damp climate of the *Taranaki* district makes it ideal for dairying. Milk is sent to co-operative creameries where it is made into butter and cheese. The skim milk is used for fattening pigs which provide bacon and hams for the home market. On the more sheltered Wellington Plains sheep and cattle are bred in approximately equal numbers. The North Island as a whole carries about 80 per cent. of the total cattle and slightly more than half the sheep in the country.

It is interesting to note that, while in the drier regions of Australia sheep are grazed mainly for wool, in New Zealand, where even the drier areas have a moderate rainfall, the farmer breeds sheep that produce good meat as well as wool. Thus though Australia has nearly four times as many sheep as New Zealand, yet the latter country exports five times as much mutton and lamb.

Similarly, owing to the damp climate, cattle are bred for dairy purposes rather than for beef, and New Zealand, with less than a quarter of the cattle of Australia, exports some-

what more butter than that country, and eleven times as much cheese, as well as condensed milk and various by-products of the dairy industry.

Wellington stands on a splendid hill-encircled harbour in the south-west of the North Island. It was selected as the capital of New Zealand on account of its central position. Its situation on Cook Strait makes it more easily reached by sea from all parts of New Zealand than any other port. In an island country, where nearly all the chief towns are ports, coastal trade is important. Like Auckland, the capital is conveniently placed for overseas trade with Australia and, via Panama, with the British Isles and other distant lands. The city is a collecting centre for wool, mutton, and dairy produce, as well as for fruit grown on both sides of Cook Strait, but especially round *Nelson*, in the South Island, which is famed for its apples.

The South Island

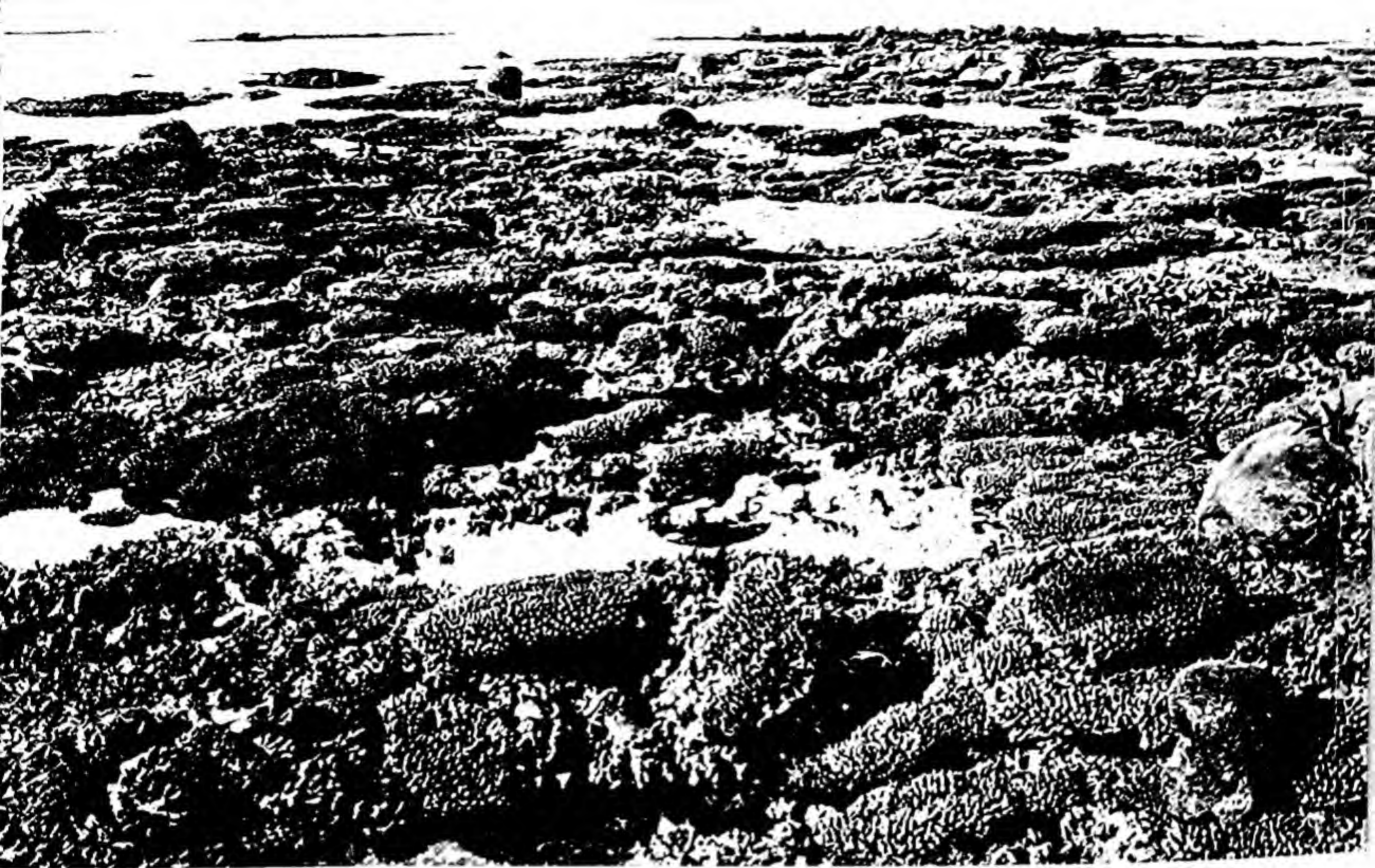
The Southern Alps, the backbone of the South Island, reach the coast in the north-east where their steep cliffs are indented by the sounds opening from Cook Strait, and also in the south-west where the sounds rival in grandeur and beauty the fiords of Norway, British Columbia, and South-West Chile. Along their flanks the Alps descend to belts of foot-hills, called Downs, while their higher slopes are trenched by the valleys of many rivers, fed by melting snows and heavy rains. These swift streams are useless for navigation, but their waters furnish power to generate electricity which is being increasingly used not only in towns but on the farms.

The Eastern Plains, with their sunny climate due to the lack of cloud, their adequate but not too heavy rainfall, and their level stretches which allow of the use of machinery, are an ideal region for wheat production. Eighty per cent. of the New Zealand wheat is grown on the Canterbury Plains. Most of the remainder comes from Southland, in



7. MOUNTAIN, PASTURE, AND BUSH IN NEW ZEALAND

(Above) The extinct volcanic cone of Mount Egmont, its summit sheeted with snow, dominates the well-watered pasture lands of the famous Taranaki dairying district in the North Island of New Zealand. Note the tall ferns in the foreground (see pp. 61 and 62). (Below) A scene in the beautiful New Zealand bush. Some idea of the height and girth of trees may be obtained by comparing them with the men seen in the foreground (see p. 63)



8. IN THE SOUTH SEAS

(Above) The Great Barrier Reef of Australia at low tide. Stretching for 1,200 miles along the coast of Queensland, it is the work of coral polyps. (Below) The 'High' volcanic island of Tahiti. Note the coconut palms on the 'Low' coral island to the right. The islands of the South Seas are famed for their coconut palms. The schooner is collecting copra (see pp. 72-7)

the south-east, which is also noted for oats, cattle, and sheep. At one time New Zealand exported wheat, for it is a commodity that keeps well and can stand a long sea voyage to distant markets. But when cold storage was introduced farmers were able to export perishable products like meat, butter, and fruit, which in proportion to their bulk command high prices. Consequently, much land that was once under wheat is now used for other purposes and to-day New Zealand grows scarcely enough wheat for her own requirements.

The chief occupation of the farmers of the Canterbury Plains and the Downland country which rises behind them is sheep farming. In many districts the natural pastures have been improved by sowing English grasses which are more luxuriant than the native tussock varieties. Many farmers breed fat lambs. There are numerous freezing establishments where the carcasses of the sheep and lambs are frozen, and after being inspected and graded are exported, mainly to the United Kingdom.

Christchurch, the largest town in the South Island, is connected by rail with its port of *Lyttelton*, some few miles distant. Christchurch makes railway rolling stock, agricultural implements, clothes, furniture, and electrical apparatus. But though the principal industrial centre of the Dominion, it rather resembles a country town in England, for manufacture has not yet placed its impress upon New Zealand. Owing to the small population there is no large home market, and the industries of the country deal mainly with the treatment of primary products, such as turning milk into butter, cheese, and condensed milk; freezing meat; and sawing timber. From Christchurch the railway runs south to Port Chalmers and thence along the shores of Otago Harbour to *Dunedin*, set on hills overlooking the sea. Continuing south, the line crosses the Clutha, a river whose sands are dredged for gold, and which gathers the waters of several mountain lakes lying amidst the fine

mountain scenery of the South-West. *Invercargill* is the chief town of Southland, from whose port, the Bluff, a steamer service runs to Hobart, 940 miles distant.

Westward from Christchurch, the railway runs through the Downland country, climbs the Southern Alps to Arthur's Pass, where it crosses under the summit through

FOREIGN TRADE OF NEW ZEALAND			
EXPORTS		IMPORTS	
Butter		Textiles	
Frozen Meat		Petroleum	
Wool		Iron & Steel	
Cheese		Motor Cars	

FIG. 24.

the Otira Tunnel (5½ miles), the longest in the British Empire. Thence it descends the forested western side of the mountains to Greymouth and the West Coast Plain.

The chief occupations in this isolated *West Coast Plain* are mining and lumbering. *Greymouth*, and *Westport* farther north, are ports for the coal-mining district, whose coal is equal in quality to any in the world. *Hokitika*, to the south, stands on the river of the same name, whose sands like those of the Clutha and other New Zealand rivers are dredged for alluvial gold.

EXERCISES

1. Give *two* reasons to account for each of the following: (i) Why nearly all the wheat in New Zealand is grown in the east of the South Island; (ii) Why the Taranaki district is an important dairying district; (iii) Why the south-west of New Zealand is popular with tourists; (iv) Why the winters in New Zealand are mild; (v) Why the west of New Zealand is wetter than the east; (vi) Why manufacturing is not very important in New Zealand.

2. Draw a sketch-map to show why Wellington is well placed to be the capital of New Zealand.

CHAPTER VIII

THE PACIFIC ISLANDS

The Pacific—Greatest Ocean in the World

Who has not revelled in *Treasure Island*, Robert Louis Stevenson's fascinating story of the South Seas, or been stirred by his descriptions of romantic islands set beneath the brilliant blue skies of the mid-Pacific? No other ocean in the world appeals so strongly to our imagination. No other islands cast so great a spell. Some of the Europeans who have visited them fall captive to this spell and remain; those of us who return to our homes in distant lands carry clinging memories of verdant and sunny isles rising above sapphire seas.

The Pacific is longer, wider, and deeper than any other ocean; it covers one-third of the earth's surface; and its area is greater than that of all the dry land. This vast expanse of water stretches from the Arctic Circle to the far south, where its waters mingle with those of the Southern Ocean—a distance from north to south of 9,300 miles. It extends from the coasts of Asia and Australia to those of the Americas, its breadth at its widest part exceeding 10,000 miles. So deep are some portions of this ocean that if Mount Everest, the world's highest peak, were sunk therein its summit would lie 3,000 feet or more below the surface of the water. The Pacific is encircled by a ring of fire, for around its shore rise most of the world's active volcanoes; and it contains more islands than all other oceans combined.

The islands, if we exclude those off the coast of Asia, lie mainly in the Southern Pacific, between the Southern Continents of South America and Australia. They may be divided into (1) Continental Islands, such as New Guinea,

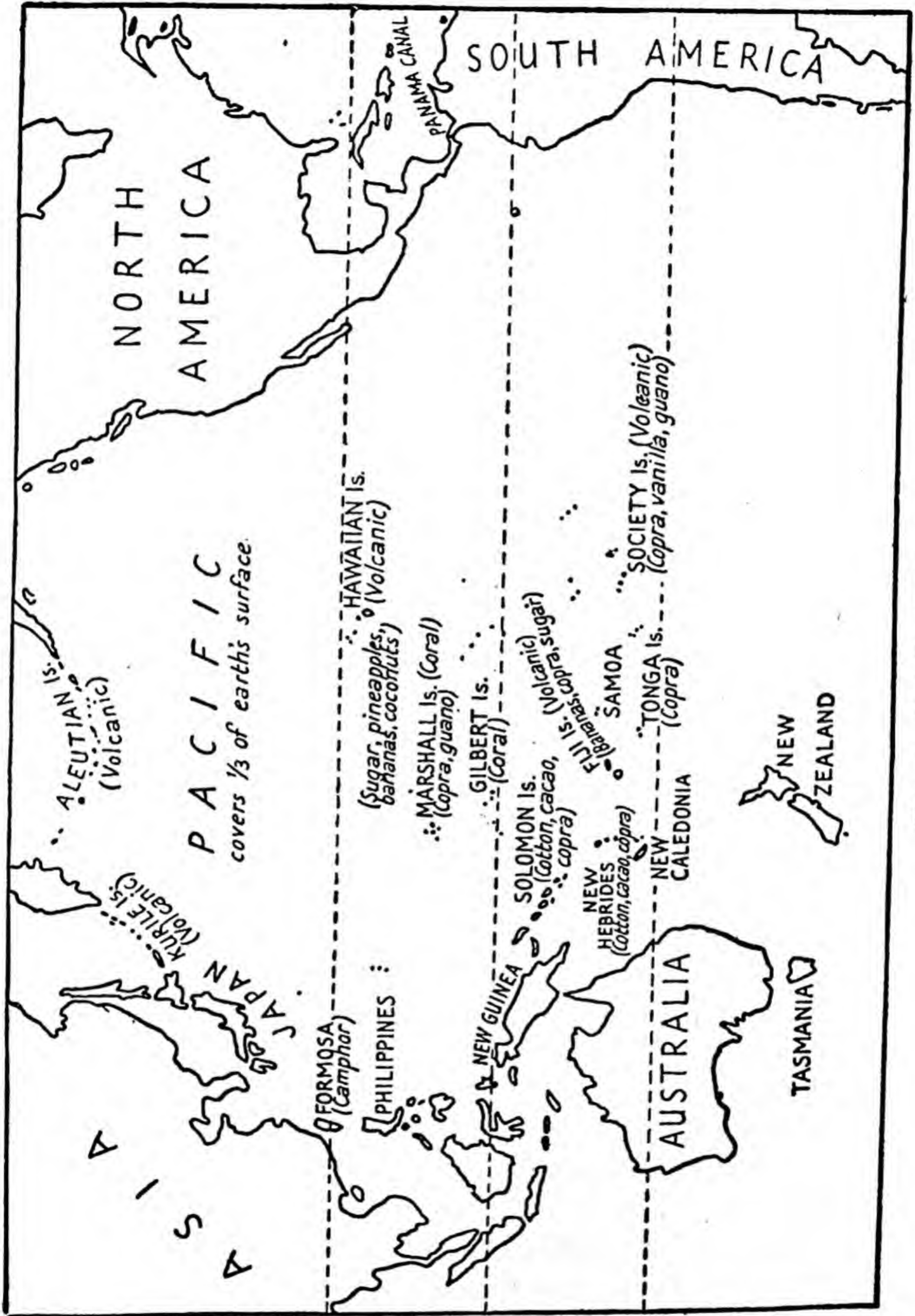


FIG. 25. The Pacific Ocean

on the continental shelf of Australia, and (2) Oceanic Islands.

A Continent Island—New Guinea

New Guinea, the largest island in the world, except Australia, is nearly three and a half times the size of Great Britain. Much of the island is mountainous, but in the south a lowland, drained by the Fly River, stretches to the shallow Torres Strait and the Arafura Sea which separate New Guinea from Australia. As the island extends from the Equator to 10° S. it is hot and wet at all seasons, though the different regions receive their heaviest rainfall at different times of the year according to the direction of the seasonal winds. Forests clothe the mountains almost to their summits; and along the sandy shores, their reddish roots and brown trunks contrasting with the deep blue of the sea, stand coconut palms. Coconuts, rubber, and sisal are grown on plantations. Breadfruit, bananas, yams, and sago which is obtained from the pith of a palm, are the staple food crops of the natives, who supplement this vegetarian diet with fish.

Most of the coastal tribes are Melanesians, who have dark skins and frizzy hair. But they are of very mixed origin, for they have intermingled with people of the Pacific islands to the east, as well as those coming from the East Indies. The coast folk are mainly seamen and fishermen who visit the surrounding seas for pearl oysters, and the waters of the Great Barrier Reef for *bêche-de-mer* and trochus. They delight in diving, gathering shells, and handling boats, for their maritime environment makes such work second nature. The Papuan tribes dwelling in the isolated and forested interior are dark and have a mop of woolly hair. Some are still cannibals and head-hunters, and, like the pygmies also found in this region, are still living in the Stone Age. But it is a mistake to regard these people as belonging to the lowest type of savages. Many build large

communal dwellings, and in the Fly River district some construct houses which are over 500 feet long, and are divided into compartments for different families.

New Guinea is rich in minerals, but owing to difficulties of communication, due to the rugged relief and forested nature of the country, only gold is worked. The Bulolo gold-field, in British territory, lies only 70 miles inland, but so difficult is land transport that aeroplanes are used to carry passengers, mining machinery, ores, and even cows to supply milk to the mining community.

The west of New Guinea is Dutch. The east is British. The latter area is divided into *Papua*, of which the chief settlement is Port Moresby, governed by Australia; and the Mandated Territory of *North-Eastern New Guinea* which formerly belonged to Germany.

Oceanic Islands

There are countless islands strewn over the Pacific, and by far the greater number lie in tropical latitudes. Few parts of the world enjoy a more delightful climate than these islands, for the tropical heat is lessened by the Trade Winds that sweep over the ocean. The *high* islands receive rain on their windward sides, but some of the *low* islands suffer from drought.

Coral Islands

The *low* islands have been built up over long periods of time by the coral polyp. These organisms live, multiply, and build only in calm, clear, very warm, and comparatively shallow salt water. Most corals are found in colonies made up of innumerable polyps crowded so closely together that it is impossible to distinguish one from another. Have you ever examined a piece of unpolished coral? Each tiny hole was once the home of a polyp. The coral polyps cannot build above the high-water mark, for they die if exposed to

the air for more than a few hours at a time. Their work is age-long and continuous and they build upwards and outwards at the rate of some 2 inches a year.

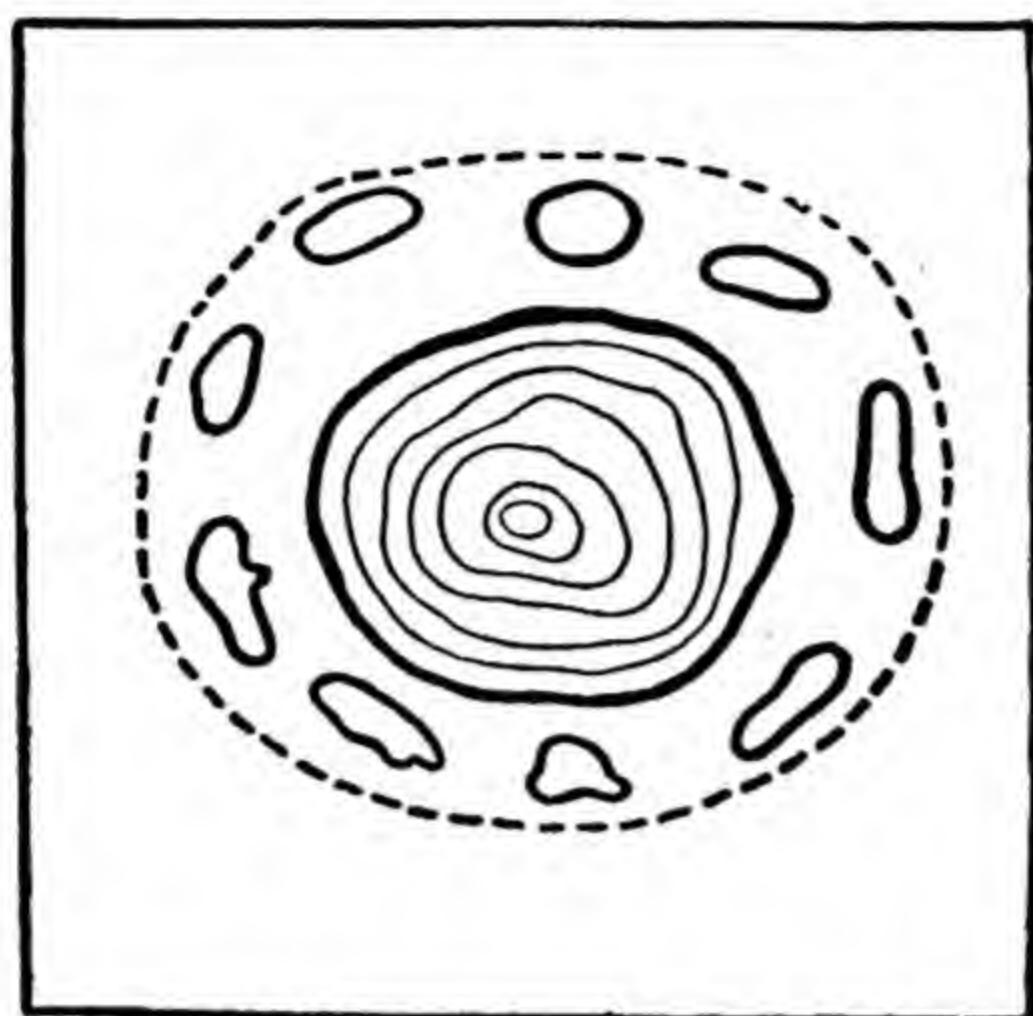


FIG. 26. Fringing Reef round high volcanic island

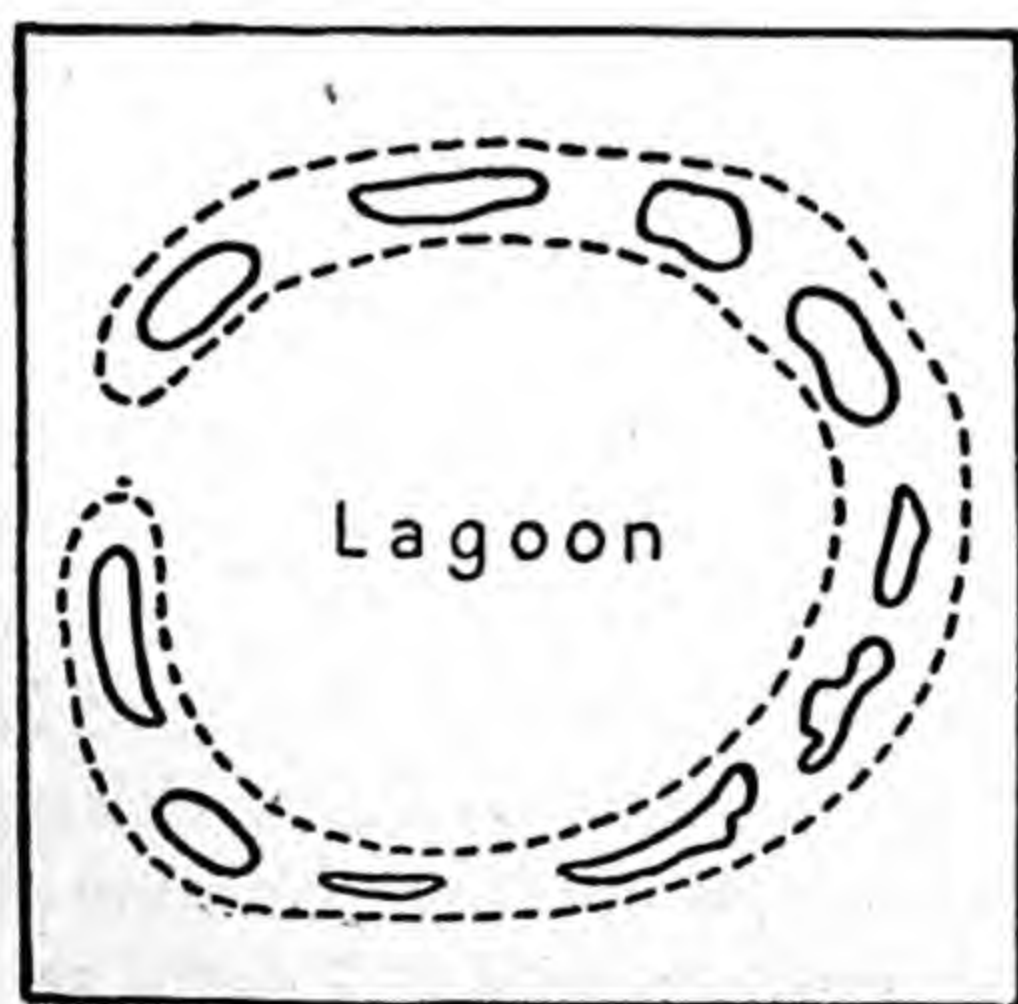


FIG. 27. Coral Atolls

In the open ocean coral islands rise from submerged ridges and peaks whose summits are usually not less than 200 feet below the surface. Newly formed islands are almost awash. But gradually blocks of coral, broken by the waves, are thrown up on the surface of the emerging island and ground into coral sand. By the action of the sea this is

gradually cemented into a compact mass of limestone, and may rise in time to a height of 10 or 12 feet, and occasionally to as much as 30 feet above sea-level.

There are three kinds of coral islands.

Atolls are belts of coral, often more than a mile wide, circular, oval, and sometimes triangular in shape, which enclose expanses of water called *lagoons*. The lagoons generally, though not always, have an entrance—often deep enough to allow the passage of large ships—on the side opposite the prevailing winds. Some lagoons are relatively small, but others are quite large, and one in the Marshall Islands actually measures 100 miles across.

Fringing reefs grow close to and around other islands, often of volcanic origin.

Barrier Reefs, like the Great Barrier Reef of Australia, lie some distance from the land and usually descend to considerable depths on their seaward side (Plate 8).

Coral in time is ground down into coral sand, and soil is brought to the islands by ocean currents and drifts. Seeds are brought by birds and currents, and also by man, and so plant life develops. The vegetation on coral islands is usually limited to coconuts and pandanus (screw) palms which fill almost every need of the inhabitants, though on some of the larger islands breadfruit, yams, and other crops are grown. But coconuts, land crabs, and fish are the chief foods. Few ships call except occasional luggers and tramp steamers collecting copra, used in the manufacture of soap, margarine, and vegetable oils. Truth to tell, romantic though they sound, palm-fringed coral islands are lonely and uncomfortable homes. Yet since 1935 some of the hitherto isolated and uninhabited atolls that dot the Pacific waters have attained a new importance, for their lagoons provide bases for flying-boats on Trans-Pacific routes.

Volcanic Islands

The *high* volcanic islands are much larger than the coral islands. On a map of the Pacific, Tahiti and Hawaii are scarcely more than tiny dots, yet the former is three times as large as the Isle of Man, and the latter half as large as Wales. As we should expect from their formation, the high volcanic islands rise steeply from the ocean, but their rugged outline is softened by masses of luxuriant vegetation rising almost to the crests of their highest peaks. Their palm-fringed beaches of golden sand margin a narrow plain, built up of sediment brought down by streams fed by heavy tropical rains. On the plain the fields are green with rice, sugar-cane, yams, taro roots, and breadfruit, the staff of life of Polynesia. On the slightly higher ground beyond the coastal strip pineapples are often cultivated. The taro has large leaves, rather like those of the lily, which spring from a big bulbous root. This root is cooked and used as a vegetable; and sometimes it is ground into a paste from which a native dish called *poi* is made.

Among the chief volcanic groups are the Fiji, Samoan, and Hawaiian Islands.

The Fiji Islands, which belong to Britain, are in all slightly larger than Wales. They are situated on both sides of longitude 180° , and between latitudes 15° S. and 22° S. Thus they lie in the belt of the South-East Trades and their windward sides receive heavy rain. The largest islands, Viti Levu and Manua Levu, produce coconuts, bananas, sugar-cane, and other food crops. Suva, the capital, on Viti Levu, stands on a magnificent harbour.

The Samoan Islands to the north of the Fiji group, formerly German, are now administered by New Zealand under a Mandate from the League of Nations. They yield copra, cacao, and bananas. *Nauru*, an atoll 26 miles south of the Equator, is also governed by New Zealand. Like Ocean Island (British), it is noted for phosphate deposits.

The Hawaiian Islands belong to the United States. Their climate much resembles that of the Fiji and Samoan Islands, for though they lie north of the Equator, they are situated in similar latitudes. On the southern lowlands of Hawaii, the largest island, quantities of sugar-cane and pineapples are grown. In the centre of this island the enormous active volcano of Mauna Loa rises to over 13,000 feet above sea-level, and more than 30,000 feet above the ocean bed. *Honolulu*, the capital, is the best-equipped port in the Mid-Pacific. Owing to its central position it is a crossing place for most of the main Trans-Pacific sea routes, and an important air base. Most of the trade of the Hawaiian Islands is with the United States, goods being shipped from Honolulu to San Francisco, 2,500 miles or a five days' journey distant by sea.

The Pacific Islanders and their Environment

The islanders of the Pacific may be divided into Micronesians, Melanesians, and Polynesians. The Micronesians ('people of the small islands') are found in island groups, such as the Gilberts, lying north of the equator. Melanesia means 'the islands of the blacks', and the frizzy-haired, dark-skinned people called Melanesians live along the coasts of New Guinea and in the islands stretching east about as far as 180°. The Polynesians ('the people of the many islands'), who inhabit the islands east of latitude 180°, are taller than the Melanesians, and have brown skins and dark hair. They are noted for their good looks and splendid physique and are akin to the Maoris of New Zealand.

It is not surprising that the Pacific islanders have from early times been skilled and daring seamen. Long before the Norman Conquest they roamed over the ocean in their open canoes, travelling from island to island, making journeys ranging from 100 to as much as 1,000 miles. They were as much at home on the water as on their palm-fringed islands. The former yielded fish: the latter provided wild

fruits and vegetables, which thanks to the warm climate grew in abundance. Thus the people adapted their lives to their oceanic surroundings. Some of the more enterprising, such as the Maoris, migrated to temperate lands where they modified their mode of life to suit new conditions. But the majority remained content with their simple palm-leaf huts, and saw no virtue in working hard when nature provided so abundantly.

But the warm climate and their all too easy existence proved their undoing, and the coming of the white man brought disaster to many of the Pacific peoples. They learnt bad habits from seamen and traders, and fell victims to diseases introduced by contact with civilization. It is estimated that fifty years ago there were 4 million people scattered over the Pacific islands: to-day their number is little more than a million. Thus in half a century almost three-quarters of the native population have disappeared.

EXERCISES

1. How are coral islands formed? Describe, with diagrams, the chief types of coral islands. What do they produce? Why have some become of great importance in recent years?

2. (a) How are *high* islands formed? Give examples. Give an account of the crops, and describe the life led by the peoples of a high island. (b) Describe the scene shown in Plate 8 (bottom).

3. Select one island, or group of islands, in the Pacific, and show how the people adapt their lives to their surroundings.

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LOOKING BACK AT THE SOUTHERN CONTINENTS

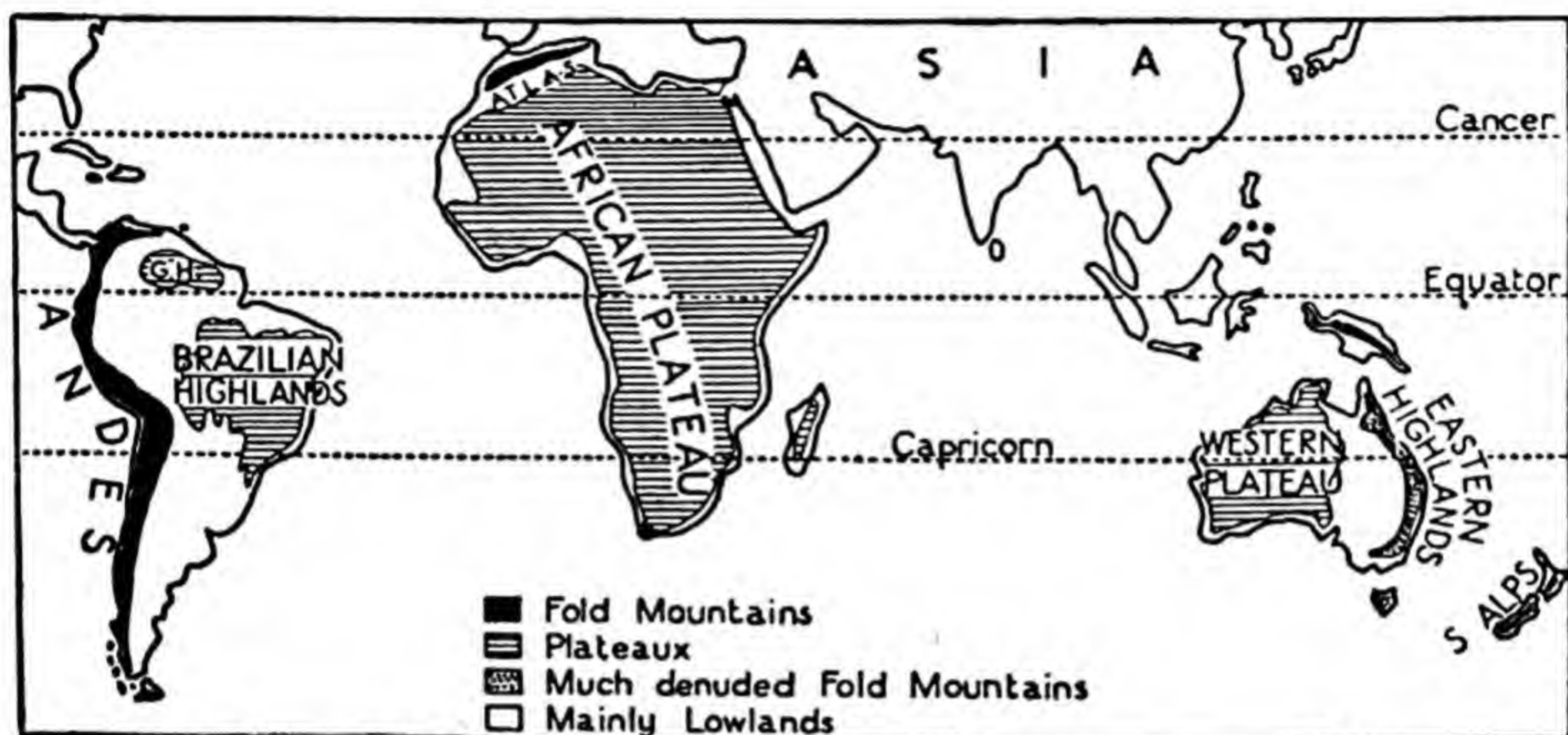


FIG. A. Southern Continents: Physical Map

Position and Size

SOUTH AMERICA, Africa, and Australia are called the Southern Continents, not because they lie wholly in the Southern Hemisphere, but because they are situated south, respectively, of North America, Europe, and Asia. Before we leave them let us look back and ask ourselves in what ways the Southern Continents resemble, and in what ways they differ from each other, and how their peoples adapt their lives to the conditions under which they live.

Fig. A shows that Australia is the only Southern Continent wholly in the Southern Hemisphere; and that Africa alone is crossed by the equator and both tropics. Australia is the smallest of all continents. Africa is the second largest and its area exceeds that of South America and Australia combined.

Relief and Rivers

Apart from the Atlas Mountains, practically the whole of Africa is a plateau which rises by steep escarpments from narrow coastal plains. In Australia, the Western Plateau occupies more than half the continent, and in South America the Brazilian and Guiana Highlands cover considerable areas. But the most striking feature in the relief of the latter continent is the fold mountain system of the Andes, which extends right along the west coast. These mountains, like the escarpments of the African Plateau and those of the Australian Alps, render communication difficult. In South America, which has a much greater lowland area than either of the other continents, plains extend from the Atlantic into the basins of the Orinoco, the Amazon, and the rivers draining into the Plate estuary. All these watercourses are navigable for long distances, and, in the case of the Amazon, ocean steamers can ascend the river for 1,000 miles, while smaller vessels can travel upstream for another 1,000 miles to the base of the Andes. The African rivers are navigable for hundreds of miles in their middle courses, but as they are interrupted by rapids where they fall over the edges of the plateau, they cannot be used as waterways from the ocean to the interior. Only on the Nile are the rapids a considerable distance from the sea, but the chief value of this river is that it makes possible the irrigation of Upper and Lower Egypt, where the population exceeds 1,000 to the square mile. The main importance of the Murray and other Australian rivers also lies in the fact that their waters enable large areas to be irrigated. The New Zealand rivers, though little used for navigation, furnish power for generating electricity.

Climate, Natural Vegetation, and Crops

As South America and Africa taper towards the south, the bulk of both continents lies within the tropics. Australia is more fortunate. Nearly two-thirds of this continent is

the southern savannas of Africa, and those of Northern Australia lying in similar latitudes, during the summer. Towards the south the southern savannas pass into warm temperate grasslands, comprising the *pampas* of the Argentine, the *veld* of South Africa, and the grasslands of the Murray Basin in Australia. In these grasslands, both warm and hot, stock-rearing is the main occupation. Savanna

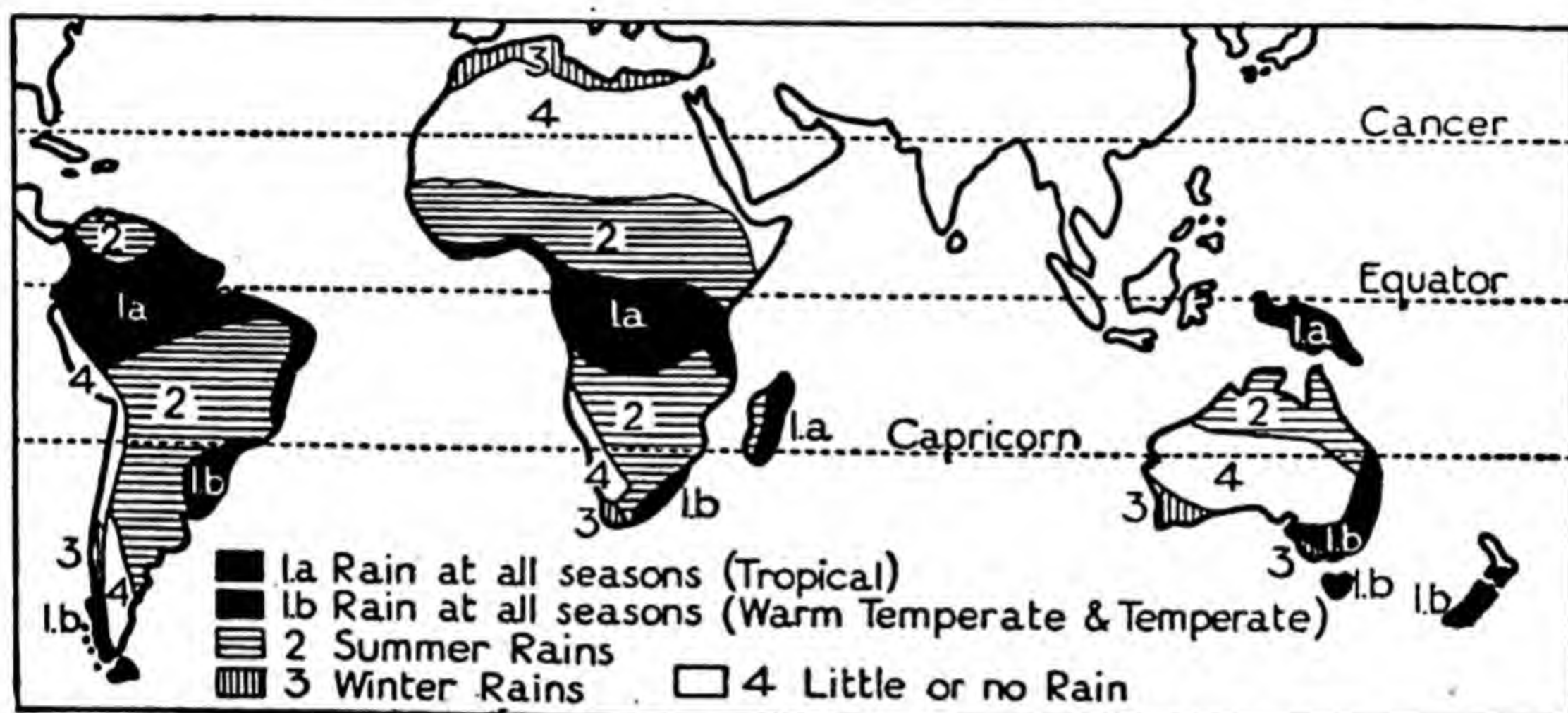


FIG. F. Southern Continents: Seasonal Rainfall

crops include ground-nuts grown in the drier regions, and cotton cultivated in such areas as Uganda; while in the temperate grasslands wheat and maize are the principal crops.

The coast-lands, lying to the east of the southern savannas, receive relief rains (S.A. p. 24) from the on-shore trades, and so form a forested belt with plantation crops, such as coffee in Brazil, and sugar-cane in Natal and Queensland.

In North Africa the coastal regions, like those of Central Chile, South-West Africa, and the south-western extremities of Australia, have a Mediterranean type of climate. During the hot summers the winds blow off-shore, but in the mild winters, owing to the swing of the rain belts, on-shore westerly winds bring rain. The natural vegetation is adapted to withstand the summer droughts. Vines and

6 SOUTHERN CONTINENTS: A COMPARISON

cereals can be grown without irrigation, though it is necessary for oranges and other warm temperate fruits.

New Zealand and Tasmania, which lie in the Brave West Wind belt throughout the year, receive relief rains which are extremely heavy on the windward sides of the mountains.

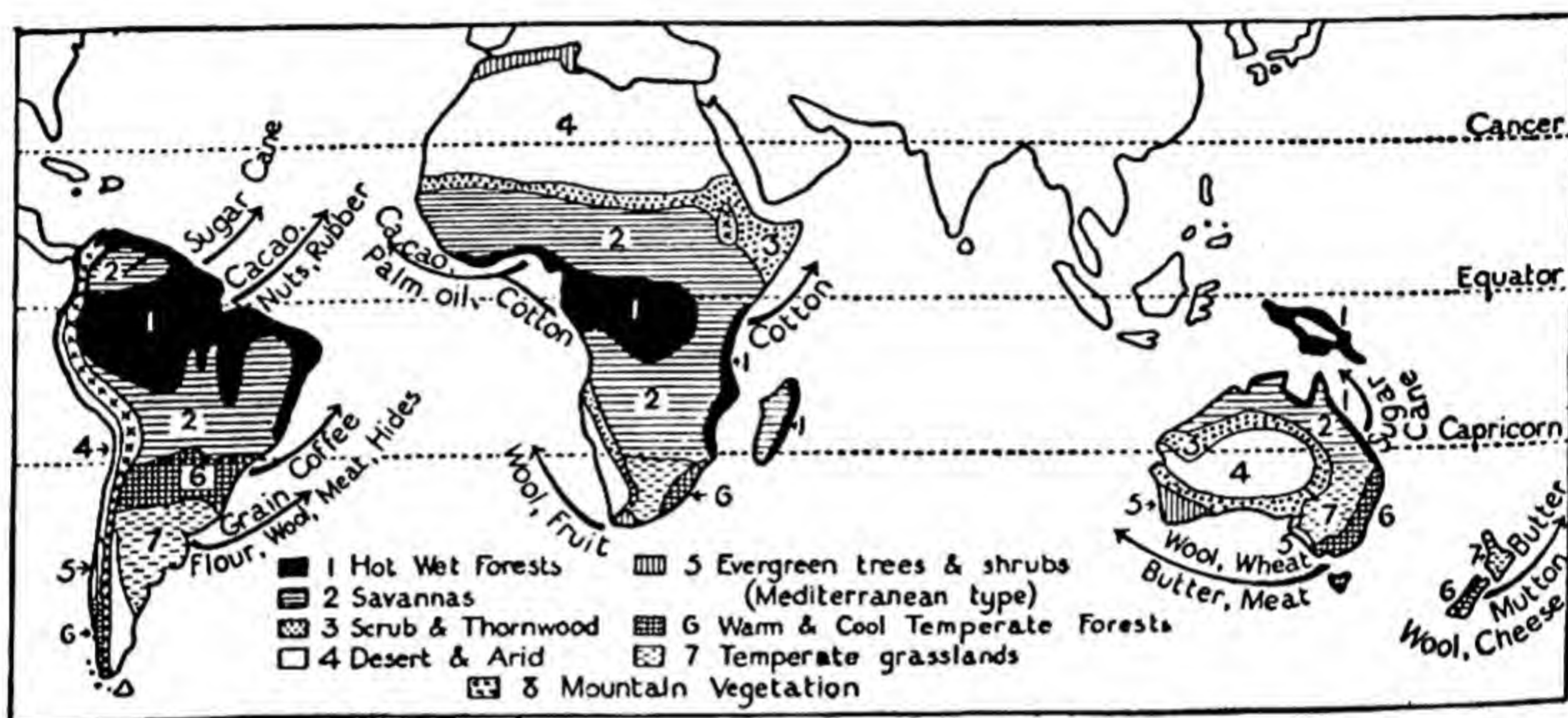


FIG. G. Southern Continents: Natural Vegetation and Product

Minerals

Ores often occur in regions, such as the Andes, where folding has brought ore-bearing rocks close to the surface; and also in regions, such as Western Australia, where the bare rock surfaces make it relatively easy to discover them.

The lure of gold drew the Spanish conquistadors to South America, and though relatively little gold is now obtained from this continent, the Andean region is rich in copper, tin, and silver, and nitrates won from the Atacama Desert. Bauxite, the ore of aluminium, is obtained from the Guianas; petroleum from Venezuela. The Union of South Africa leads the world in the production of gold and diamonds; copper and gold are obtained from Northern Rhodesia and the Belgian Congo; iron-ore and phosphates from Algeria. In Australia large

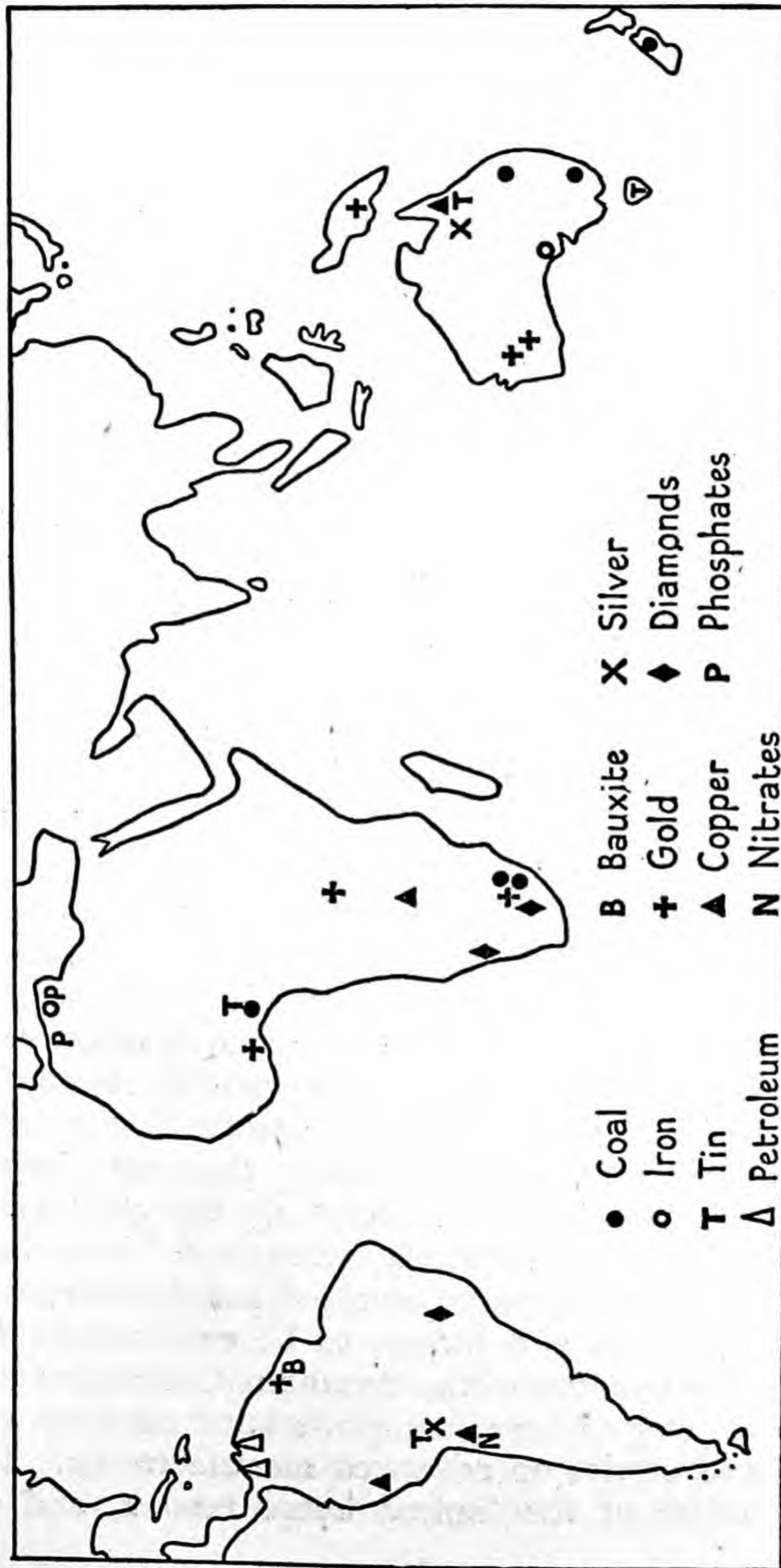


FIG. H. Southern Continents: Minerals

quantities of silver, lead, copper, gold, and iron-ore are mined. But more valuable is coal, in the output of which Australia leads the Southern Continents.

Primary Producing Lands

The Southern Continents are mainly primary producing lands, whose crops and minerals are marketed in the industrial countries of the Northern Hemisphere. The tropical belt yields cacao, cotton, sugar-cane, copra, and coffee, as well as ground-nuts and palm oil. The grasslands of Argentina and Australia furnish vast quantities of meat, wheat, and wool; the veld of South Africa wool; and the pastures of New Zealand mutton, dairy produce, and wool. The Mediterranean regions export oranges and other warm temperate fruits; Tasmania and New Zealand provide apples. And the farmers of the Southern Hemisphere are able to sell their crops in Europe, and especially in the British Isles, just as the supplies in the Northern Hemisphere are beginning to fail.

There are no great manufacturing countries in the Southern Continents. In the tropical regions of South America and Africa primitive manufacturing, such as the making of homespun cloth, is almost the only kind carried on. In more progressive countries, such as Argentina, South Africa, Australia, and New Zealand, manufacturing is mainly concerned with freezing or canning meat; turning hides into leather; converting wheat into flour; milk into butter, cheese, or condensed milk; fruit into jam; and smelting and refining ores. Formerly the chief products of the grasslands were wheat, wool, and hides, but the introduction of refrigeration enabled perishable commodities, such as meat and butter, to be exported to distant markets. No country in the Southern Continents has yet reached the stage where it imports large amounts of raw material and carries on advanced manufacturing. This is partly because of the limited home market, and partly

because of the shortage of labour. So long as a country is engaged mainly in primary production, its chief imports are usually clothing, machinery, and iron and steel goods.

Peoples and Settlement

All the Southern Continents are thinly populated. In South America there are only 12 persons to the square mile

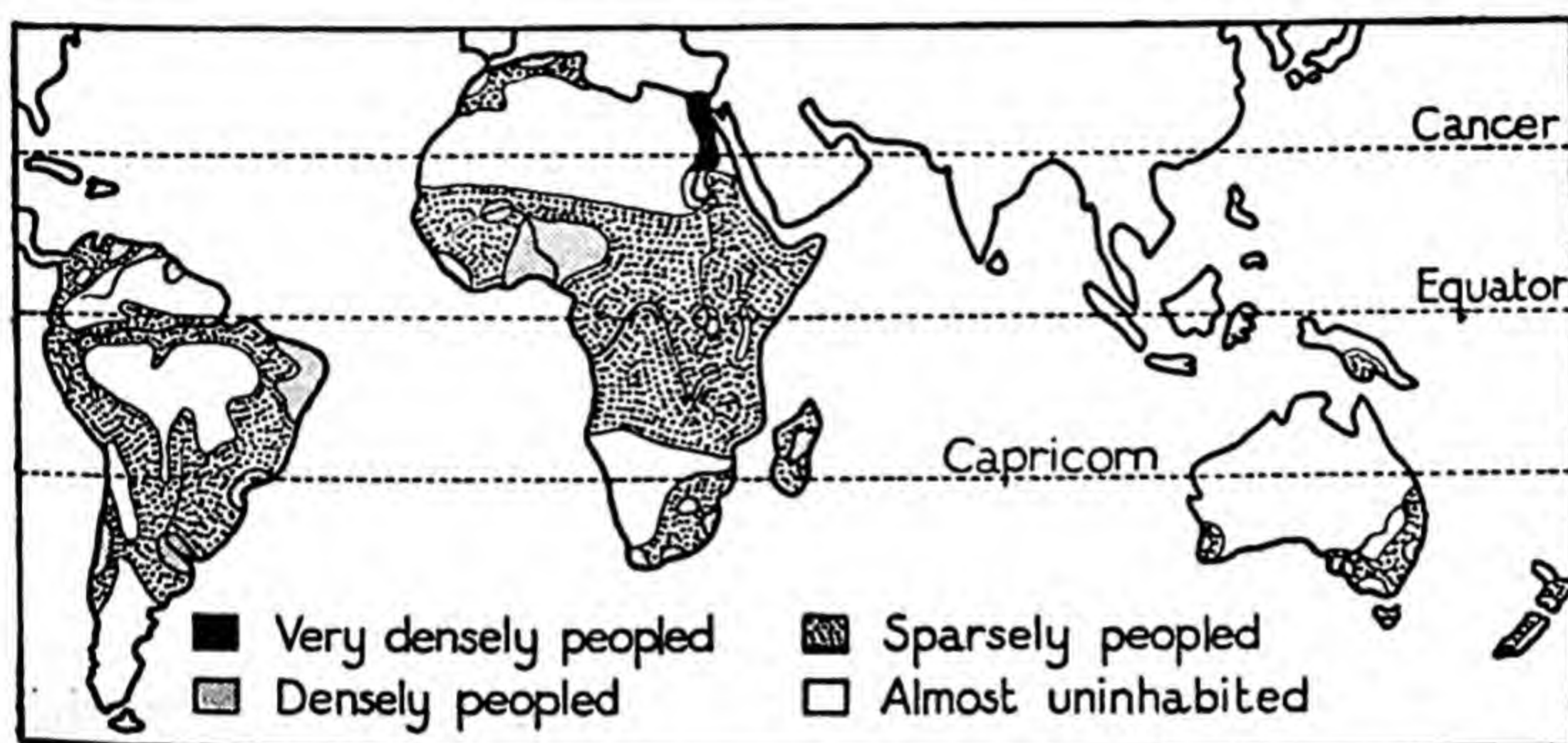


FIG. I. Southern Continents: Distribution of Population

compared with 147 in Europe. In the tropical regions the people are principally of mixed Indian and Spanish or Portuguese blood, though along the east coast-lands live many folk wholly or partly of negro stock. In the temperate countries—Argentina, Uruguay, and Chile—the inhabitants are mainly of Spanish, Portuguese, or Italian origin. Africa, so long 'The Dark Continent', is still the most backward, but it is being steadily opened up by the European nations who control the greater part of it. Yet this immense continent has on an average only 14 persons to the square mile. In tropical Africa there are 1,000 natives to every white person. Only in the highlands of the tropical belt can Europeans make permanent homes, and white settlement is mainly confined to the temperate lands in the north and south of the continent.

Australia, with 2 persons to the square mile, is the most sparsely populated continent, and practically all the inhabitants are white. Even when Europeans first settled in Australia there were few aborigines: to-day their number is negligible. New Zealand, thanks to its insular climate, is more closely settled than Australia and has 15 persons to every square mile. The great distance of Australia and New Zealand from Europe retarded settlement, and it was not until gold was discovered that people arrived in large numbers.

In each continent the building of railways to the mining areas played no small part in the development of the regions through which they passed. But even to-day no country in the Southern Continents has a railway mileage, in proportion to its size, comparable to that of Great Britain.

Routes by Sea and by Air

As the trade of the Southern Continents is mainly with Europe, the principal ocean routes are those linking them with that continent. Before the opening of the Suez Canal vessels outward bound from England to Australia travelled by the Cape Route, which meant a much longer journey. Similarly, the cutting of the Panama Canal shortened the distance between England and New Zealand. In the days of sailing ships it took six months to go from England to Australia; now it takes six weeks. The cheapness and speed of modern steamers render transport relatively easy, and at the same time the aeroplane is rapidly making distance of little account. In each of the Continents the principal cities are linked by air, and it is possible to travel from Buenos Aires, Cape Town, Sydney, or Wellington to London almost as quickly as it is to go by steamer from England to Montreal. But the aeroplane is mainly used for carrying passengers and mails, and not for the transport of heavy goods.

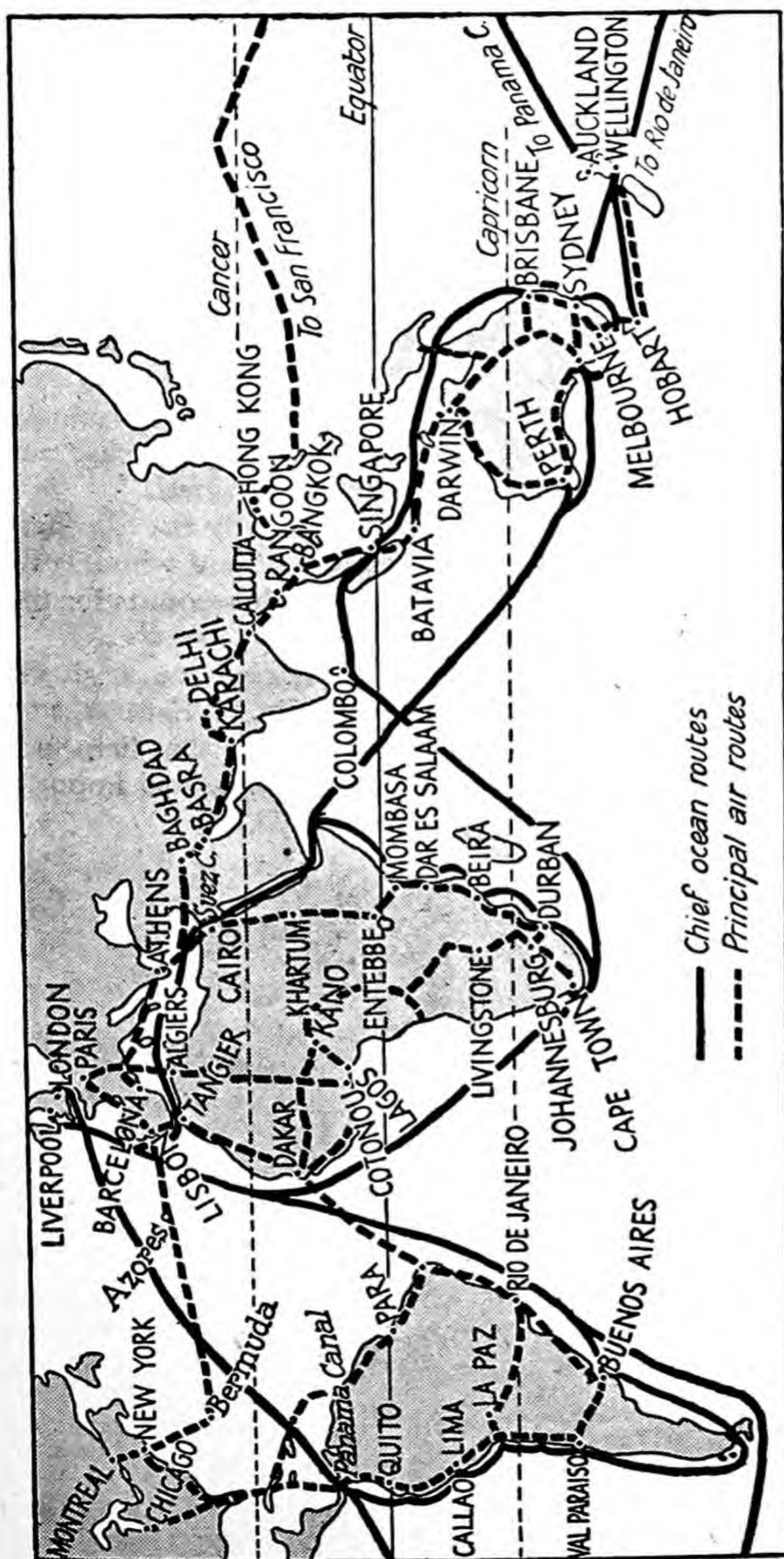


FIG. J. Southern Continents: Communications

The interchange of commodities between the Southern Continents and Europe should help to contribute to that sympathetic understanding between the various peoples, which is essential if the nations of the world are to live together in peace.

EXERCISES

1. Compare the Southern Continents under the headings (a) Position, (b) Size, and (c) Relief.
2. Name *four* tropical products and *four* temperate products which the Southern Continents export to Europe. In each case name *one* area from which the product in question is obtained.
3. Give *four* reasons which help to explain why the Southern Continents are thinly peopled. In which continent and where is the most thickly peopled region? Give *one* reason which accounts for the dense population of this area.
4. What do you mean by a primary producing country? Give *one* example and name *four* of its primary products. What forms of *simple* manufacturing are carried on? Give *two* reasons that help to explain why there is little advanced manufacturing. Name *two* imports of the country in question.

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